

# ACM-NDC Study 2018–2019:

## Seventh Annual Study of Non-Doctoral-Granting Departments in Computing

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In fall 2018 and winter 2019, ACM conducted the seventh annual survey of Non-Doctoral-Granting Departments in Computing. Referred to as the ACM-NDC Study, the survey provides timely data about 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) to present a more complete picture of the state of academic computing; this more complete picture is of interest to and used by institutional administrators, faculty, employers, and the media. This article reports the results of the 2018-2019 survey, with comparisons and contrasts to data reported in the Taulbee Survey and, as appropriate, last year's NDC survey results. Additionally, for the second year in a row, our report looks at trends from all the years of NDC data—last year six years, this year seven years.

## INTRODUCTION

Timely data about enrollments, degree production, diversity, and salaries are of keen interest to university faculty and administrators. These persons use the data to compare their academic units to others at their institution and to units in the same discipline at other institutions. Employers use such data to help them assess recruiting opportunities against their company's needs. The importance of computing to society also makes the media interested in reporting not only what is, but what trends appear to be important.

In fall 2018 and winter 2019, ACM conducted the seventh annual survey of Non-Doctoral-Granting Departments in Computing. This ACM-NDC Study, or simply NDC as it is often called, is intended to be an annual complement to the Computing Research Association (CRA) long-running Taulbee Survey of PhD-granting departments in computing [6]. 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 expand pipeline information on programs that produce candidates for PhD 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 value of the data is enhanced because the survey is conducted by an organization that is respected by the community. The authors comprised the NDC Steering Committee.

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 PhDs) in the five computing disciplines in which curricular guidelines and accreditation criteria exist [1,2]: 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 to qualifying programs identified by using data in the Integrated Post-secondary Education Data System (IPEDS) [3]. 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 [4]. This year the survey was distributed to 1,012 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 programs are housed in different schools or departments. It should be noted that the 2017-2018 survey was sent to 1,098 units,

86 more than this year. The smaller number of surveys sent out this year was the result of clean-up of our records to remove outdated information.

The survey was released in mid-September 2018, earlier than any other year since the survey launched, as part of our continued effort to provide respondents more time to gather data. While the percentage of units providing at least some information increased from 17.4% to 18.5%, this was due to fewer surveys having been sent this year. Looking at the earlier release in the past couple of years, it is not clear that moving

the survey dates makes any meaningful impact on response rates. Fewer units reported bachelor's, master's data, faculty composition and salary data in 2018-2019 than one year ago. In total, 187 units participated in the survey (compared to 191 last year), supplying either complete or partial information. Of these, 130 units supplied data about their bachelor's programs (compared to 149 in 2017-2018). Data was reported for 279 total programs (226 bachelor's and 53 master's), compared to 304 last year. We found that 147 academic units provided data on faculty (161 in 2017-2018) and 81 provided faculty salary information (94 in 2017-2018).

A new data-gathering pilot currently underway shows promise in expanding our access to student degree and enrollment data, effectively increasing the number of programs by several factors as well as providing a look at computing programs in cybersecurity. The Committee is cautiously optimistic and hopes to report on this effort in 2020.

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 [5]. With seven years of data in hand, this is the second year our report looks at longitudinal trends since 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 use the term “academic unit” (or “unit”) to refer to the administrative division responsible for one or more qualifying programs. We 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).
- A given academic unit may offer multiple programs.
- Degree production (master's and bachelor's) refer to the previous academic year (2017-2018).
- Data for current faculty as well as new students in all categories refer to the current academic year (2018-2019) for which the survey is given.

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## ACM-NDC Study 2018-2019: Seventh Annual Study of Non-Doctoral-Granting Departments in Computing

## BACHELOR'S DEGREE PRODUCTION AND ENROLLMENTS

The 2018-2019 NDC survey was distributed to 1012 units having bachelor's program. Responses were received from 130 units, a rate of 12.8%. By comparison, the response rate in the 2017-2018 survey was 13.6%. Table B1 reveals that the percentage of public institutions among this year's respondents was slightly higher in comparison to last year (40.0% vs. 38.9%), while the percentage of master's granting units dropped (25.4% vs. 29.3%).

As Table B2 indicates, computer science programs comprise the majority of total programs again this year (65.0% or 147 programs). The computer science percentage of total programs, and those corresponding percentages for computer engineering and software engineering, are similar to their respective percentages last year, while the information technology percentage is higher and the information systems percentage is lower than last year. The highest percentage of ABET accredited programs was reported in computer engineering (62.5%) followed by software engineering (41.2%) and computer science (23.8%). Higher accreditation rates than last year were reported in information systems (17.2% vs. 8.3%) and information technology (12.0% vs. 4.3%). As has been the case in previous years, the accreditation rates of programs over all disciplines is higher for public than private institutions (33.0% vs. 18.5%) and higher for master's granting than non-master's granting institutions (38.8% vs. 16.4%).

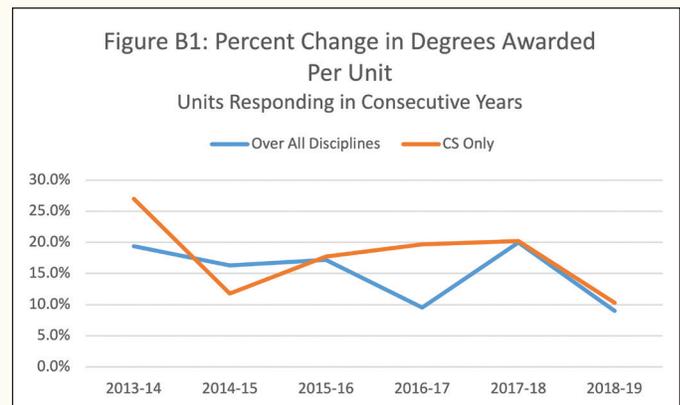
Table B3A depicts actual degree production and anticipated change in degree production for the 128 survey respondents that provided projected degree data. Because comparisons of interest from this table are across broad institution types, normalizations in this table are by unit. Across all institution types, the projected percentage increase in degree production per unit is higher than in 2017-2018 for all disciplines (18.3% vs.

**TABLE B1. SUMMARY OF ACADEMIC UNITS RESPONDING TO BACHELOR'S SECTION OF SURVEY**

	Number of Programs	% of Total Responses
Yes	130	12.8%
No	882	87.2%
<b>Total Surveys</b>	<b>1,012</b>	
Public	52	40.0%
Private	78	60.0%
<b>Total Yes</b>	<b>130</b>	
Master's	33	25.4%
Non-Master's	97	74.6%
<b>Total Yes</b>	<b>130</b>	

8.5%) and in computer science only (21.5% vs. 9.5%). Public institutions projected higher percentages of change than private for all disciplines (23.0% vs. 12.2%) and in computer science only (26.5% vs. 15.0%). Projected degree production per unit at master's granting institutions is higher than non-master's granting institutions for all disciplines (20.1% vs. 16.0%) and in computer science only (24.5% vs. 19.3%). In computer science, the projected percent increase in degree production per unit is reported to be higher than that reported by Taulbee institutions (21.5% vs. 8.2%). This year's Taulbee projection is lower than last year's (8.2% vs. 12.6%).

Actual growth in degree production between 2016-2017 and 2017-2018, also with normalizations by unit, is reported in Table B3B for those units that reported degree production for both years. The one-year percentage increase in actual degree production per unit is lower than was reported last year in computer science programs (10.6% vs. 20.3%), breaking a three-year rising trend (Figure B1). A lower percentage increase was also evident across all disciplines (9.0% vs. 20.3%), although the percentage increases in previous years have been more variable across all disciplines than they have in computer science. Lower percentage increases were reported regardless of institution type with the largest differences occurring at public institutions (6.8% vs. 29.4% across all disciplines and 8.8% vs. 25.5% in computer science only). In contrast to NDC institutions, this year's Taulbee survey reports a higher percentage change in degree production in comparison to last year over all disciplines (20.1% vs. 18.0%).



**TABLE B2. SUMMARY OF PROGRAM OFFERINGS**

	Overall				Public			Private			Master's			Non-Master's		
	N Units	Count	% of Total	% ABET	Count	% of Total	% ABET	Count	% of Total	% ABET	Count	% of Total	% ABET	Count	% of Total	% ABET
CS	120	147	65.0%	23.8%	57	62.6%	38.6%	90	66.7%	14.4%	42	52.5%	47.6%	105	71.9%	14.3%
CE	8	8	3.5%	62.5%	3	3.3%	66.7%	5	3.7%	60.0%	2	2.5%	100.0%	6	4.1%	50.0%
IS	26	29	12.8%	17.2%	9	9.9%	22.2%	20	14.8%	15.0%	15	18.8%	33.3%	14	9.6%	0.0%
IT	21	25	11.1%	12.0%	15	16.5%	13.3%	10	7.4%	10.0%	15	18.8%	13.3%	10	6.8%	10.0%
SE	16	17	7.5%	41.2%	7	7.7%	28.6%	10	7.4%	50.0%	6	7.5%	33.3%	11	7.5%	45.5%
<b>Totals</b>	<b>130</b>	<b>226</b>	<b>100.0%</b>	<b>24.3%</b>	<b>91</b>	<b>100.0%</b>	<b>33.0%</b>	<b>135</b>	<b>100.0%</b>	<b>18.5%</b>	<b>80</b>	<b>100.0%</b>	<b>38.8%</b>	<b>146</b>	<b>100.0%</b>	<b>16.4%</b>

TABLE B3A. DEGREE PRODUCTION AND ANTICIPATED CHANGE BY PROGRAM TYPE

	All Respondents													
	CS Only							All Disciplines						
	N Units	N Programs	2017-2018 actual	2017-2018 actual per Unit	2018-2019 projected	2018-2019 projected per Unit	projected % change per unit	N Units	N Programs	2017-2018 actual	2017-2018 actual per Unit	2018-2019 projected	2018-2019 projected per Unit	projected % change per unit
Public	47	56	1,827	38.9	2,311	49.2	26.5%	50	87	2,572	51.4	3,158	63.2	23.0%
Private	71	89	1,419	20	1,634	23	15.0%	78	131	1,989	25.5	2,229	28.6	12.2%
Master's	30	41	1,422	47.4	1,770	59	24.5%	32	78	2,232	69.8	2,682	83.8	20.1%
Non-Master's	88	104	1,824	20.7	2,175	24.7	19.3%	96	140	2,329	24.3	2,705	28.2	16.0%
NDC Overall	118	145	3,246	27.5	3,945	33.4	21.5%	128	218	4,561	35.6	5,387	42.1	18.3%
Taulbee	130* (120*)	NA	23,988	184.5	23,951	199.6	8.2%	145* (134*)	NA	31,148	214.8	31,205	232.9	8.4%

\* Taulbee CS data is from U.S. CS departments only

\*\* Taulbee all disciplines data includes U.S.CS, U.S.CE and U.S.I departments and CS, CE and I degrees

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

	Units Responding Both Years													
	CS Only							All Disciplines						
	N Units	N Programs	2016-2017 actual	2016-2017 Avg per Unit	2017-2018 actual	2017-2018 Avg per Unit	% change of avg per unit	N Units	N Programs	2016-2017 actual	2016-2017 Avg per Unit	2017-2018 actual	2017-2018 Avg per Unit	% change avg per unit
Public	37	44	1,054	28.5	1,146	31	8.8%	38	63	1,455	38.3	1,554	40.9	6.8%
Private	51	68	1,018	20	1,139	22.3	11.5%	56	106	1,469	26.2	1,632	29.1	11.1%
Master's	24	34	839	35	988	41.2	17.7%	26	59	1,326	51	1,471	56.6	11.0%
Non-Master's	64	78	1,233	19.3	1,297	20.3	5.2%	68	110	1,598	23.5	1,715	25.2	7.2%
NDC Overall	88	112	2,072	23.5	2,285	26	10.6%	94	169	2,924	31.1	3,186	33.9	9.0%
Taulbee (US CS Depts)	NA	NA	NA	NA	NA	NA	NA	125	NA	23,413	187.3	28,125	225.0	20.1%

TABLE B4A. DEGREE PRODUCTION AND ANTICIPATED CHANGE BY DISCIPLINE

	All Respondents						
	N Units	N Programs	2017-2018 actual	2017-2018 actual per Program	2018-2019 projected	2018-2019 projected per Program	% Change
NDC Overall	128	218	4,561	35.6	5,387	42.1	18.3%
CS	118	145	3,246	27.5	3,945	33.4	21.5%
CE	6	6	56	9.3	111	18.5	98.9%
IS	24	27	406	16.9	469	19.5	15.4%
IT	20	24	676	33.8	625	31.3	-7.4%
SE	15	16	177	11.8	237	15.8	33.9%

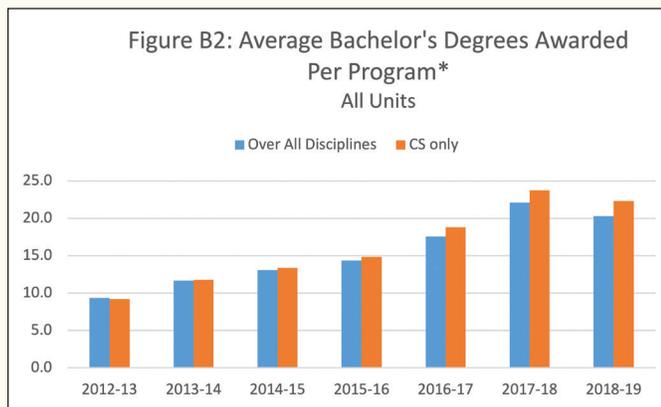
TABLE B4B. DEGREE PRODUCTION CHANGE BY DISCIPLINE - UNITS RESPONDING BOTH YEARS

	Units Responding Both Years									
	N Units	N Programs	2016-2017 actual	2016-2017 actual per Program	2017-2018 actual	2017-2018 actual per Program	% change	2018-2019 projected	2018-2019 projected per Program	% projected change
NDC Overall	94	169	2,924	17.3	3,186	18.9	9.0%	3,731	22.1	17.1%
CS	88	112	2,072	18.5	2,285	20.4	10.3%	2,740	24.5	19.9%
CE	4	4	31	7.8	34	8.5	9.7%	79	19.8	132.4%
IS	21	23	215	9.3	222	9.7	3.3%	269	11.7	21.2%
IT	14	15	416	27.7	473	31.5	13.7%	412	27.5	-12.9%
SE	14	15	190	12.7	172	11.5	-9.5%	231	15.4	34.3%

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Degree production and anticipated change in production broken down by discipline is reported for all respondents in Table B4A and for units responding the past two years in Table B4B. Because comparisons of interest from these tables are at the discipline level, normalizations in these tables are by program. Like the comparison in actual degree change reported above, the projected one-year percentage change per program among those responding in consecutive years is higher across all disciplines (17.1% vs. 12.8%) and in computer science (19.9% vs. 12.0%). For both the “all respondents” and “responding in consecutive years” groups, computer engineering, information systems and software engineering all project growth in degree production, while a decline in degree production is projected in information technology for all respondents (-7.4%) and for those reporting both years (-12.9%). Small numbers of programs in all disciplines except computer science should be noted when considering the magnitude of reported results.

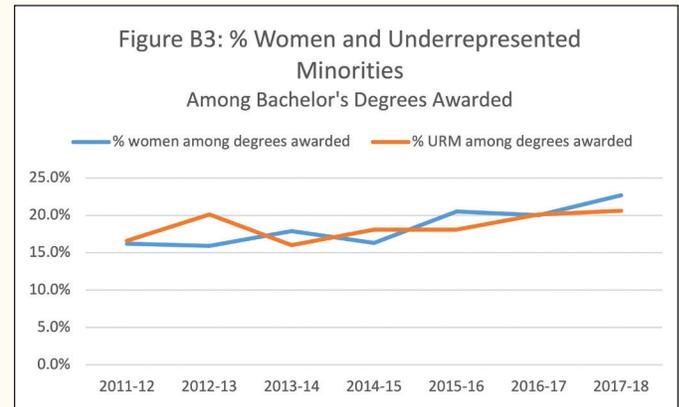
Table B5A reports a summary of total bachelor's degrees awarded in 2017-2018 broken down by discipline, institution type, and gender. A total of 4,587 degrees were awarded by the 226 reporting programs, an average of 20.3 degrees per program. In computer science, a total of 3,271 degrees were awarded by 147 programs, an average of 22.3 degrees per program. Both averages are lower than those reported last year (22.1 over all disciplines and 23.7 in computer science). Figure B2 depicts the average number of majors per program in computer science and over all disciplines for the seven-year history of the NDC.



\*Note: Reported averages are based on degree data for the previous academic year.

The percentage of bachelor's degrees awarded to women at NDC institutions in 2017-2018 was 22.7%, an increase over the 20.0% reported last year. This year's percentage was higher than that reported by Taulbee institutions (21.2%). Computer science programs reported the highest percentage of women (24.4%) followed by information systems (23.7%), information technology (18.4%), software engineering (11.3%) and computer engineering (7.1%). Computer science had the one-year largest increase in percentage of degrees awarded to women (24.4% vs. 19.0%) while computer engineering had the largest one-year decrease (7.1% vs. 20.8%). Private institutions awarded a high-

er percentage of degrees to women in all disciplines except information systems while non-master's institutions awarded a higher percentage of degrees to women in all disciplines except information technology. Figure B3 depicts the percentage of bachelor's degrees awarded to women over the history of NDC.



\*Note: Reported percentages are based on degree data for the previous academic year.

Table B6 presents the percentages of bachelor's degrees awarded broken down by ethnicity. In comparison to Taulbee institutions and consistent with prior NDC surveys, a higher percentage of degrees is awarded to Black/African-Americans (7.3% vs. 3.8%), Hispanic/Latino (9.8% vs. 8.4%) and White (59.7% vs. 45.7%) students. The percentage of degrees awarded to US residents who are considered underrepresented (i.e., non-White, non-Asian) is 20.3%. This percentage is slightly higher than last year (20.1%) and higher than that reported by Taulbee institutions (15.8%). The seven-year history of NDC ethnicity data appears in Figure B3.

Changes in mean computer science enrollment per academic unit, broken out by institution type, is reported in Table B7. Among all NDC respondents and over all institution types, the percentage increase in enrollment is lower than that reported last year (8.0% vs. 17.0%). Public and master's granting institutions reported a higher percentage increase this year versus last (respectively 12.3% vs. 5.4% and 39.7% vs. 12.8%). When considering the more reliable information for those institutions reporting in consecutive years, the percentage change in mean computer science enrollment over all institution types rose in 2018-2019 (9.4% vs. 8.1%). Increases in the percentage change were seen at all institution types with the largest increase at non-master's granting institutions (6.3% vs. 3.5%) and the smallest increase at master's granting institutions (12.3% vs. 11.6%).

Table B8 shows one-year changes in mean enrollment per program, broken out by discipline. Only the more reliable results for those units responding in both 2017-2018 and 2018-2019 are discussed in this section. Over all disciplines, the percentage change per program of 7.7% is higher than that reported last year (6.8%). Higher percentages of change were reported this year over last in computer science (8.6% vs. 8.2%), computer engineering (10.9% vs. 0.8%), information systems (4.0% vs. 2.5%) and software en-

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

	Male		Female		Total Known Gender	Gender Unknown	Grand Total	N Units	N Programs
CS Overall	2,303	75.6%	744	24.4%	3,047	224	3,271	120	147
CS Public	1,408	82.2%	304	17.8%	1,712	140	1,852	48	57
CS Private	895	67.0%	440	33.0%	1,335	84	1,419	72	90
CS Master's	1,081	81.2%	250	18.8%	1,331	116	1,447	31	42
CS Non-Master's	1,222	71.2%	494	28.8%	1,716	108	1,824	89	105
CE Overall	52	92.9%	4	7.1%	56	0	56	8	8
CE Public	21	95.5%	1	4.5%	22	0	22	3	3
CE Private	31	91.2%	3	8.8%	34	0	34	5	5
CE Master's	24	96.0%	1	4.0%	25	0	25	2	2
CE Non-Master's	28	90.3%	3	9.7%	31	0	31	6	6
IS Overall	306	76.3%	95	23.7%	401	5	406	26	29
IS Public	201	74.4%	69	25.6%	270	5	275	8	9
IS Private	105	80.2%	26	19.8%	131	0	131	18	20
IS Master's	228	78.9%	61	21.1%	289	5	294	12	15
IS Non-Master's	78	69.6%	34	30.4%	112	0	112	14	14
IT Overall	501	81.6%	113	18.4%	614	62	676	21	25
IT Public	257	82.9%	53	17.1%	310	61	371	12	15
IT Private	244	80.3%	60	19.7%	304	1	305	9	10
IT Master's	296	79.6%	76	20.4%	372	61	433	11	15
IT Non-Master's	205	84.7%	37	15.3%	242	1	243	10	10
SE Overall	149	88.7%	19	11.3%	168	10	178	16	17
SE Public	71	93.4%	5	6.6%	76	2	78	7	7
SE Private	78	84.8%	14	15.2%	92	8	100	9	10
SE Master's	50	89.3%	6	10.7%	56	2	58	6	6
SE Non-Master's	99	88.4%	13	11.6%	112	8	120	10	11
NDC Overall	3,311	77.3%	975	22.7%	4,286	301	4,587	130	226
Taulbee Overall#	24,901	78.8%	6,713	21.2%	31,614	2,239	33,853	155	NA

TABLE B6. BACHELOR'S DEGREES AWARDED BY ETHNICITY (130 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	Total
NDC Overall	394	14	467	20	291	2,389	107	322	4,004	418	165	4,587
	9.8%	0.3%	11.7%	0.5%	7.3%	59.7%	2.7%	8.0%	100.0%			
CS	294	10	368	18	141	1,674	83	234	2,822	292	157	3,271
	10.4%	0.4%	13.0%	0.6%	5.0%	59.3%	2.9%	8.3%	100.0%			
CE	5	1	8	1	1	31	2	2	51	5	0	56
	9.8%	2.0%	15.7%	2.0%	2.0%	60.8%	3.9%	3.9%	100.0%			
IS	30	2	26	0	66	232	8	9	373	27	6	406
	8.0%	0.5%	7.0%	0.0%	17.7%	62.2%	2.1%	2.4%	100.0%			
IT	60	1	62	1	80	313	9	67	593	83	0	676
	10.1%	0.2%	10.5%	0.2%	13.5%	52.8%	1.5%	11.3%	100.0%			
SE	5	0	3	0	3	139	5	10	165	11	2	178
	3.0%	0.0%	1.8%	0.0%	1.8%	84.2%	3.0%	6.1%	100.0%			
Taulbee Overall#	2,413	70	7,350	85	1,103	13,208	891	3,764	28,884	1,238	3,786	33,853
	8.4%	0.2%	25.4%	0.3%	3.8%	45.7%	3.1%	13.0%	100.0%			

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TABLE B7. COMPUTER SCIENCE ENROLLMENT CHANGE BY PROGRAM TYPE

	All Respondents							Units Responding Both Years					
	2017-2018			2018-2019				2017-2018			2018-2019		
	N Units	Headcount	Mean Enroll	N Units	Headcount	Mean Enroll	% Increase	N Units	Headcount	Mean Enroll	Headcount	Mean Enroll	% Increase
<b>NDC Overall</b>	121	17,385	143.7	119	18,468	155.2	8.0%	88	11,409	129.6	12,474	141.8	9.4%
<b>Public</b>	49	11,625	237.2	47	12,515	266.3	12.3%	37	6,826	184.5	7,598	205.4	11.3%
<b>Private</b>	72	5,760	80	72	5,953	82.7	3.4%	51	4,583	89.9	4,876	95.6	6.3%
<b>Master's</b>	24	5,757	239.9	30	10,055	335.2	39.7%	24	5,757	239.9	6,465	269.4	12.3%
<b>Non-Master's</b>	97	11,628	119.9	89	8,413	94.5	-21.2%	64	5,652	88.3	6,009	93.9	6.3%
<b>Taulbee</b>	131	116,439	888.8	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		
	2017-2018	2018-2019	% Change in Mean per Program	2017-2018	2018-2019	% Change in Mean per Program
<b>All Disciplines</b>						
# units	136	128	-5.9%	84	84	0.0%
# programs	217	224	3.2%	135	135	0.0%
Bachelor enrollment	23,882	25,642	4.0%	14519	15635	7.7%
<b>CS</b>						
# units	121	119	-1.7%	79	79	0.0%
# programs	143	146	2.1%	92	92	0.0%
Bachelor enrollment	17,385	18,468	4.0%	10,548	11,451	8.6%
<b>CE</b>						
# units	6	8	33.3%	4	4	0.0%
# programs	6	8	33.3%	4	4	0.0%
Bachelor enrollment	687	439	-52.1%	285	316	10.9%
<b>IS</b>						
# units	31	26	-16.1%	18	18	0.0%
# programs	32	29	-9.4%	19	19	0.0%
Bachelor enrollment	2,153	2,068	6.0%	1,096	1,140	4.0%
<b>IT</b>						
# units	18	21	16.7%	9	9	0.0%
# programs	20	25	25.0%	9	9	0.0%
Bachelor enrollment	2,570	3,480	8.3%	1,657	1,644	-0.8%
<b>SE</b>						
# units	15	15	0.0%	11	11	0.0%
# programs	16	16	0.0%	11	11	0.0%
Bachelor enrollment	1,087	1,187	9.2%	933	1,084	16.2%

gineering (16.2% vs. 0.6%). Only information technology reported a decline in bachelor enrollment and a lower percentage of change in mean per program (-0.8% vs. 7.7%).

Table B9 summarizes the average number of majors per program, average number of new majors per program, and the percentage of new majors among majors. Across all disciplines and institution types, the average number of majors per program rose in comparison to last year (114.9 vs. 109.5) as did the average number of new majors per program (34.4 vs. 32.1) and the percentage of new majors among majors (29.9% vs. 29.3%).

Taulbee also reports an increase in average new majors per program over last year (306.6 vs. 260.2).

## MASTER'S DEGREE PRODUCTION AND ENROLLMENTS

In 2018-2019, 31 academic units reported on a total of 53 master's programs in computing, down from last year's 48 units and 60 programs, respectively. Twenty of the units, comprising 24 programs, were in public institutions and 11 units compris-

**TABLE B9. 2018-2019 BACHELOR'S ENROLLMENTS BY DISCIPLINE AND PROGRAM TYPE**

	Majors	New Majors	# Programs	Avg. Majors per Program	Avg. New Majors per Program	% of new majors among majors
CS Overall	18,328	5,473	144	127.3	38	29.9%
CS Public	12,515	3,653	56	223.5	65.2	29.2%
CS Private	5,813	1,820	88	66.1	20.7	31.3%
CS Master's	10,055	3,034	41	245.2	74	30.2%
CS Non-Master's	8,273	2,439	103	80.3	23.7	29.5%
CE Overall	439	151	8	54.9	18.9	34.4%
CE Public	119	53	3	39.7	17.7	44.5%
CE Private	320	98	5	64	19.6	30.6%
CE Master's	106	43	2	53	21.5	40.6%
CE Non-Master's	333	108	6	55.5	18	32.4%
IS Overall	2,068	580	29	71.3	20	28.0%
IS Public	1,384	366	9	153.8	40.7	26.4%
IS Private	684	214	20	34.2	10.7	31.3%
IS Master's	1,365	317	15	91	21.1	23.2%
IS Non-Master's	703	263	14	50.2	18.8	37.4%
IT Overall	3,377	1,053	24	140.7	43.9	31.2%
IT Public	1,974	667	14	141	47.6	33.8%
IT Private	1,403	386	10	140.3	38.6	27.5%
IT Master's	2,276	735	15	151.7	49	32.3%
IT Non-Master's	1,101	318	9	122.3	35.3	28.9%
SE Overall	1,187	349	16	74.2	21.8	29.4%
SE Public	737	246	6	122.8	41	33.4%
SE Private	450	103	10	45	10.3	22.9%
SE Master's	540	191	6	90	31.8	35.4%
SE Non-Master's	647	158	10	64.7	15.8	24.4%
NDC Overall	25,399	7,606	221	114.9	34.4	29.9%
Taulbee Overall #	NA	40,774	133	NA	306.6	NA

# Taulbee data includes U.S. and Canadian departments

ing 29 programs were in private institutions (Tables M1-M2). They accounted for 26 programs in computer science, nine in information systems, 11 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, make large year-to-year fluctuations more likely. This will be illustrated in some of the data presented here and should be taken into account before drawing any conclusions from this data.

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

	Number of Units	% of Total Responses
Yes	31	3.1%
No	981	96.9%
Total Surveys	1,012	
Public	20	64.5%
Private	11	35.5%
Total Yes	31	

**TABLE M2. SUMMARY OF PROGRAM OFFERINGS**

	Overall			Public		Private	
	N Units	Count	% of Total	Count	% of Total	Count	% of Total
CS	25	26	49.1%	18	75.0%	8	27.6%
CE	0	0	0.0%	0	0.0%	0	0.0%
IS	6	9	17.0%	2	8.3%	7	24.1%
IT	8	11	20.8%	4	16.7%	7	24.1%
SE	5	7	13.2%	0	0.0%	7	24.1%
Totals	31	53		24		29	

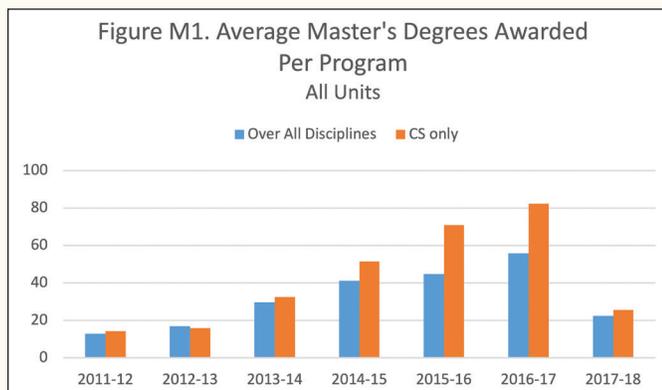
Table M3 shows actual degree production in 2017-2018 and anticipated change in that production for 2018-2019 broken down by discipline. Those institutions responding to this year's survey anticipate an overall 19.1% decrease in the production of master's degrees in 2018-2019 over those granted in 2017-2018 (Table M3). Computer science programs anticipate a 22.3% decrease. Although two programs contributed more than others to this decline, the majority of responding programs reported some decrease in degrees they expected to grant over degrees granted

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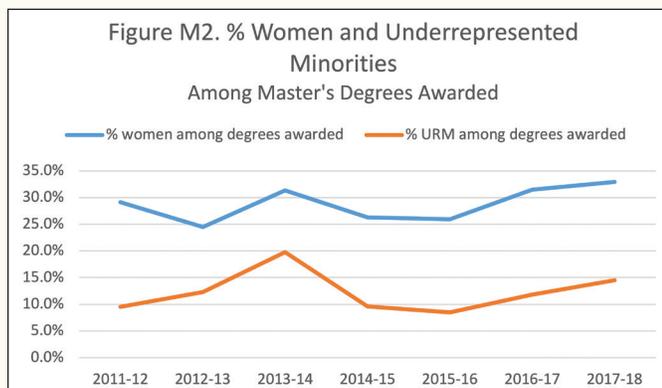
TABLE M3. DEGREE PRODUCTION CHANGE BY DISCIPLINE

			2017-2018		2018-2019		% change
	N Units	N Programs	Actual	Per Program	Projected	Per Program	
NDC Overall	30	48	1,159	24.1	937	19.5	-19.1%
CS	23	23	631	27.4	490	21.3	-22.3%
CE	0	0					
IS	6	8	132	16.5	99	12.4	-24.8%
IT	7	10	210	21	190	19	-9.5%
SE	5	7	186	26.6	158	22.6	-15.0%

in the prior year. However, due to the small NDC sample size, these expectations may not be representative of the broader set of master's programs. In comparison, Taulbee respondents reported an anticipated increase in master's degree production of 3.3% per unit over all disciplines combined. Figure M1 demonstrates the trend in average number of master's degrees awarded per program for both computer science and all disciplines combined across the seven-year history of the survey.



Among the 2017-2018 master's degree graduates, 32.9% were female, compared to 30.6% at Taulbee schools (Table M4). Computer science, the discipline with the largest response size, reported 37% female graduates, compared to 26.5% reported by Taulbee computer science master's programs. Taulbee's information ("I") programs most closely resemble information systems or information technology programs. Taulbee reported that 48.8% of their master's degrees in the information area went to females, compared to 33.6% 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 greater percentage of Hispanic/Latino US resident graduates (6.0 vs. 2.5%), Black/African-American resident graduates (6.6 vs. 1.6%), and White graduates (26.8 vs. 19.4%). The percentage of Asian graduates in NDC was smaller than in Taulbee (8.2 vs. 10.0%), and there also was a smaller percentage of non-resident graduates at NDC institutions than at Taulbee (50.5 vs. 65.4%). Interestingly, only 6.1% of NDC students were reported as being of unknown race or residency (compared to 11.1% for Taulbee), whereas last year that number was 50.6%. In the three years prior to 2018-2019, the number of enrolled students whose race/residency were reported as unknown was significantly higher than this year. The large change may be entirely due to the small sample size and the variance in academic units responding from year to year, although it also is possible that gathering ethnicity/residency data now is less of a challenge at NDC programs than in years past.

Overall enrollment at NDC master's programs reporting this year was 2,891, a 39.6% decrease in headcount over last year. A decrease in headcount would be expected given the smaller sample size this year. However, the mean enrollment per program was 55.6, a 38.4% decrease over last year (Table M6). Mean enrollment in computer science decreased 47.2%. The small sample size can easily skew this mean, especially when different programs report from one year to the next. In fact, when only those programs that responded both years are considered, overall enrollment per program increased 2.3%, with computer science programs showing a 12.8% decrease. The seven-year trend in average master's enrollments per program is shown in Figure M3 for all disciplines combined and for CS-only.

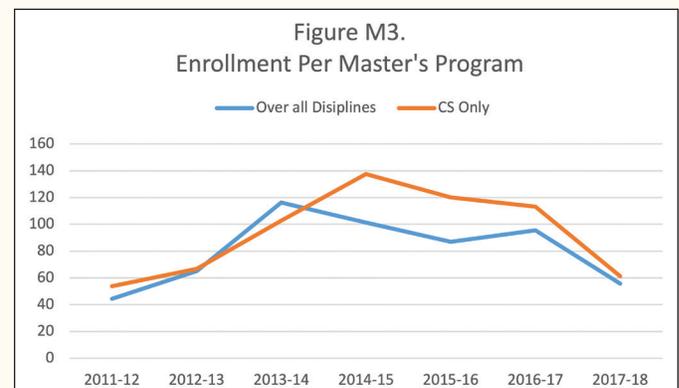


TABLE M4. MASTER'S DEGREES AWARDED BY GENDER, DISCIPLINE AND PROGRAM TYPE

	Male		Female		Total Known Gender	Gender Unknown	Grand Total	N Units	N Programs
CS Overall	397	63.0%	233	37.0%	630	9	639	24	25
CS Public	319	65.4%	169	34.6%	488	9	497	17	18
CS Private	78	54.9%	64	45.1%	142	0	142	7	7
CS Taulbee	9,179	73.5%	3,312	26.5%	12,491	866	13,357	NA	NA
CE Overall	NA	NA	NA	NA	NA	NA	NA	0	0
CE Public	NA	NA	NA	NA	NA	NA	NA	0	0
CE Private	NA	NA	NA	NA	NA	NA	NA	0	0
CE Taulbee	658	72.5%	249	27.5%	907	7	914	NA	NA
IS Overall	85	64.4%	47	35.6%	132	0	132	6	9
IS Public	21	70.0%	9	30.0%	30	0	30	2	2
IS Private	64	62.7%	38	37.3%	102	0	102	4	7
IT Overall	142	67.6%	68	32.4%	210	0	210	8	11
IT Public	41	73.2%	15	26.8%	56	0	56	4	4
IT Private	101	65.6%	53	34.4%	154	0	154	4	7
"I" Taulbee	1,538	51.2%	1,466	48.8%	3,004	23	3,027	NA	NA
SE Overall	153	82.3%	33	17.7%	186	0	186	5	7
SE Public	NA	NA	NA	NA	NA	NA	NA	0	0
SE Private	153	82.3%	33	17.7%	186	0	186	5	7
NDC Overall	777	67.1%	381	32.9%	1,158	9	1,167	30	52
Taulbee Overall#	11,375	69.4%	5,027	30.6%	16,402	896	17,298	162	NA

TABLE M5. MASTER'S DEGREES AWARDED BY ETHNICITY (31 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	Total
NDC Overall	66	2	90	0	72	294	19	553	1,096	51	20	1,167
	6.0%	0.2%	8.2%	0.0%	6.6%	26.8%	1.7%	50.5%	100.0%			
Taulbee Overall*	389	11	1,546	4	254	2,993	133	10,065	15,395	843	1,080	17,298
	2.5%	0.1%	10.0%	0.0%	1.6%	19.4%	0.9%	65.4%	100.0%			

\*(includes CS, CE, I and Canadian)

TABLE M6. ACTUAL ENROLLMENT CHANGE FROM PREVIOUS YEAR BY DISCIPLINE

	All Respondents									Units Responding Both Years						
	2017-2018				2018-2019					2017-2018				2018-2019		% Change in Mean per Program
	Number of Units	Number of Programs	Headcount	Mean Enroll	Number of Units	Number of Programs	Headcount	Mean Enroll	% Change in Mean per Program	Number of Units	Number of Programs	Headcount	Mean Enroll	Headcount	Mean Enroll	
CS	27	28	3,244	115.9	24	25	1,530	61.2	-47.2%	19	19	844	44.4	773	38.7	-12.8%
CE	1	1	157	157	0					0						
IS	5	7	377	53.9	6	9	444	49.3	-8.5%	4	6	340	56.7	361	60.2	6.2%
IT	7	11	613	55.7	8	11	583	53	-4.8%	6	10	499	49.9	541	60.1	20.4%
SE	5	6	392	65.3	5	7	334	47.7	-27.0%	4	5	267	53.4	319	63.8	19.5%
NDC Overall	33	53	4,783	90.2	30	52	2,891	55.6	-38.4%	23	40	1,950	48.8	1,994	49.9	2.3%

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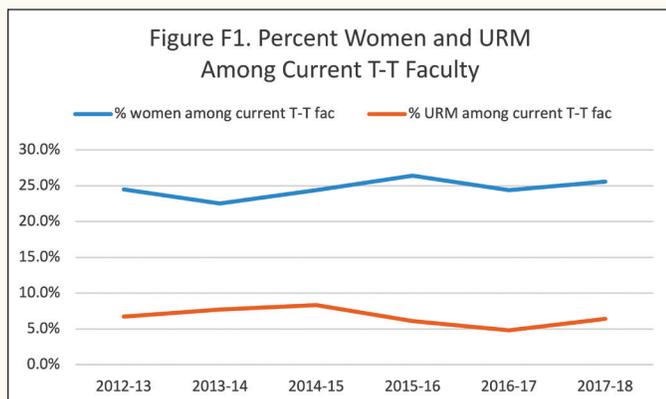
## FACULTY DEMOGRAPHICS

The average faculty size for this year's responding academic units is slightly lower than that for last year's respondents (Table F1). Total faculty head count (HC) this year averaged 13.1, with an average 11.3 full-time-equivalent (FTE). Last year's values were 13.5 and 11.6, respectively. Tenure-track size was about the same as last year (6.2 HC and 6.0 FTE vs. 6.1 HC and 5.9 FTE last year). Part-time and adjunct faculty size decreased from 5.7 (4.1 FTE) to 5.4 (3.7 FTE). The differences in units reporting this year is likely the main cause of these observations.

As has been the case in past years, tenure-track faculty comprise a larger fraction of the total faculty in units that do not have master's programs, while part-time/adjunct faculty comprise a larger fraction of the total faculty in units that do have master's programs. Public universities continue to have a slightly larger fraction of tenure-track faculty and a smaller fraction of part-time/adjuncts than do private universities.

The overall distribution of tenure-track faculty continues to be fairly even across ranks. This distribution is similar at public and private universities, while units that also have master's programs tend to have a slightly larger percentage of associate professors and somewhat smaller percentage of assistant professors than do those that do not have master's programs (Table F2).

The percentage of women among current tenure-track faculty increased slightly, to 26.3% from 25.6% last year (Table F3). Overall ethnic diversity in tenure-track faculty also improved slightly this year. The total percentage of tenure-track faculty who are Black, Hispanic, Native American, Native Hawaiian/Pacific Islander, or Multiracial, as a percentage of those tenure-track faculty for whom residency is known, was 6.8% compared to 6.4% last year (Table F4). Figure F1 shows the history of NDC reporting of faculty gender and ethnicity for each of the seven NDC surveys.



Both gender and ethnic diversity among the NDC respondents are once again greater than the corresponding diversity reported for doctoral-granting academic units in the CRA Taulbee Survey. Among 2018-2019 tenure-track faculty, the Taulbee Survey shows 20.3% women and 5.0% Black, Hispanic, Native American, Native Hawaiian/Pacific Islander, or Multiracial.

This year 89 respondents indicated that they had done recruiting for new faculty members during the 2017-2018 aca-

ademic year. They sought a total of 102 tenure-track faculty members and hired 77 for a success rate of 75.5% (Table F5). This is slightly below last year's 77.8% success rate, and is slightly below the 77.5% rate reported for tenure-track faculty hiring during the same period by doctoral-granting U.S. CS units in the Taulbee Survey. Women comprised 27.3% of the new tenure-track hires for 2018-2019. While lower than the 41% reported last year, this year's figure is comparable to those of previous years and is higher than the 22.9% reported by Taulbee units for 2018-2019. Ethnic diversity among the new tenure-track hires, measured by new hires, who are Black, Hispanic, Native American, Native Hawaiian/Pacific Islander, or Multiracial, also declined from last year's 10.7% to 3.9% (Table F6). This year's reported level is comparable to the 4.0% reported two years ago. We caution that the small numbers of total hires in these categories, both individually and collectively, and the changes in the set of units reporting in a given year, make it risky to draw wider conclusions from these data, since they are subject to wide fluctuations from year to year. Figure F2 illustrates the fluctuations in these new hire diversity statistics from year to year as reported in the NDC.

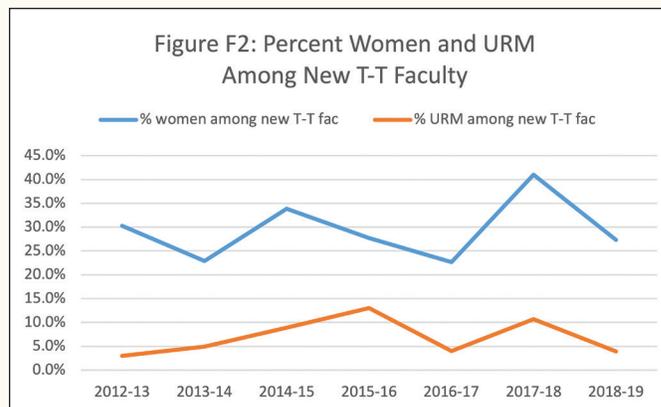


Table F7 shows the degree required for hiring and promotion of faculty at different ranks. These data do not change much from year to year. Although fewer academic units provided such information this year (130 vs. 148 last year), there were no large changes in the values in this table from those reported last year.

This year, respondents reported on departures of 41 faculty members in 33 academic units, compared to the 56 departures in 42 units reported last year. The distribution of these departures is shown in Table F8. Compared with the previous year, a larger fraction of this past year's departures left their former positions for other academic positions (29.3% vs. 19.6% last year); however, none this year were reported as having left for a non-academic position while 12.5% were in this category in last year's report.

## FACULTY SALARIES

Academic units 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

**TABLE F1. ACTUAL FACULTY SIZE 2018-2019**

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	147		147		56	91	113	34
Tenure-track	6.2	47.0%	6	53.6%	56.8%	50.8%	64.2%	43.6%
Visiting	0.4	2.9%	0.4	3.2%	3.2%	3.2%	4.1%	2.5%
FT Non-TT	1.2	8.9%	1.2	10.2%	15.8%	5.3%	8.2%	12.1%
PT/Adjunct	5.4	41.2%	3.7	33.0%	24.2%	40.6%	23.5%	41.8%
<b>Total</b>	<b>13.1</b>		<b>11.3</b>					

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

Faculty Type	Overall	Overall %	Public	Private	Non-Master's	Master's
# respondents	140		54	86	107	33
Full Professor	2.1	33.9%	34.4%	33.3%	33.2%	34.8%
Associate Professor	1.8	29.6%	28.5%	30.6%	27.2%	32.9%
Assistant Professor	2.2	35.4%	35.5%	35.4%	38.4%	31.2%
Other	0.1	1.1%	1.6%	0.7%	1.2%	1.1%

**TABLE F3. TENURE-TRACK FACULTY HEADCOUNT BREAKDOWN BY GENDER (145 units)**

Gender	Full Prof	Assoc Prof	Asst Prof	Other T-T	Total T-T
Total Faculty	302	267	317	7	893
Male	74.5%	73.4%	71.0%	42.9%	72.7%
Female	23.5%	26.2%	28.4%	57.1%	26.3%
Not Reported	2.0%	0.4%	0.6%	0.0%	1.0%
Percent Female *	24.0%	26.3%	28.6%	57.1%	26.6%

\* as a percentage of those for whom gender was reported

**TABLE F4. TENURE-TRACK FACULTY HEADCOUNT BREAKDOWN BY ETHNICITY (145 units)**

Ethnicity	Full Prof	Assoc Prof	Asst Prof	Other T-T	Total T-T
Total faculty	302	267	317	7	893
Nonresident Alien	1.7%	1.9%	7.6%	14.3%	3.9%
American Indian/Alaska Native	0.0%	0.0%	0.0%	0.0%	0.0%
Asian	18.2%	22.8%	21.1%	14.3%	20.6%
Black or African-American	1.7%	4.1%	1.9%	0.0%	2.5%
Native Hawaiian/Pacific Islander	0.0%	0.4%	0.0%	0.0%	0.1%
White	70.5%	59.9%	59.6%	71.4%	63.5%
Multiracial, not Hispanic/Latino	0.0%	0.7%	0.6%	0.0%	0.4%
Hispanic/Latino, any race	2.6%	4.1%	4.1%	0.0%	3.6%
Resident, race/ethnicity unknown	1.7%	2.6%	1.6%	0.0%	1.9%
Total Residency known	96.4%	96.6%	96.5%	100.0%	96.5%
Residency unknown	3.6%	3.4%	3.5%	0.0%	3.5%
Black+Hisp+NatAm+NatHaw+Multi*	4.5%	9.7%	6.9%	0.0%	6.8%

\* as a percentage of those for whom residency is known

**TABLE F5. FACULTY RECRUITING DURING 2017-2018 (89 units)**

Faculty Type	Number Sought	Avg/Unit	Number Filled	Success Rate
Tenure-track	102	1.15	77	75.5%
Full Professor			1	
Associate Professor			5	
Assistant Professor			69	
Other			2	
Visiting	33	0.37	26	78.8%
FT Non-TT	23	0.26	19	82.6%
PT/Adjunct	60	0.67	58	96.7%

**TABLE F6. GENDER AND ETHNICITY OF NEWLY HIRED FACULTY (92 units)**

Gender	Tenure-Track	% of Total
Male	56	72.7%
Female	21	27.3%
Unknown	0	0.0%
Ethnicity	Tenure-Track	% of Total
Nonresident Alien	13	16.9%
American Indian/Alaska Native	0	0.0%
Asian	19	24.7%
Black or African-American	1	1.3%
Native Hawaiian/Pacific Islander	1	1.3%
White	41	53.2%
Multiracial, not Hispanic/Latino	0	0.0%
Hispanic/Latino, any race	1	1.3%
Resident, race/ethnicity unknown	1	1.3%
Total Residency known	77	100.0%
Residency unknown	0	0.0%
Black+Hisp+NatAm+NatHaw+Multi	3	3.9%

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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
<b>Overall (148)</b>							
Doctoral	96.1%	92.2%	74.4%	12.6%	87.3%	95.2%	90.5%
Masters	3.9%	7.8%	25.6%	82.7%	12.7%	4.8%	9.5%
Bachelors	0.0%	0.0%	0.0%	4.7%	0.0%	0.0%	0.0%
<b>Public (54)</b>							
Doctoral	98.0%	93.9%	81.6%	8.3%	91.7%	97.9%	91.7%
Masters	2.0%	6.1%	18.4%	89.6%	8.3%	2.1%	8.3%
Bachelors	0.0%	0.0%	0.0%	2.1%	0.0%	0.0%	0.0%
<b>Private (94)</b>							
Doctoral	94.9%	91.1%	70.0%	15.2%	84.6%	93.6%	89.7%
Masters	5.1%	8.9%	30.0%	78.5%	15.4%	6.4%	10.3%
Bachelors	0.0%	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%
<b>Non-Master's (111)</b>							
Doctoral	94.8%	89.7%	68.4%	14.6%	84.2%	93.8%	88.5%
Masters	5.2%	10.3%	31.6%	80.2%	15.8%	6.3%	11.5%
Bachelors	0.0%	0.0%	0.0%	5.2%	0.0%	0.0%	0.0%
<b>Master's (37)</b>							
Doctoral	100.0%	100.0%	93.5%	6.5%	96.8%	100.0%	96.7%
Masters	0.0%	0.0%	6.5%	90.3%	3.2%	0.0%	3.3%
Bachelors	0.0%	0.0%	0.0%	3.2%	0.0%	0.0%	0.0%

TABLE F8. TENURE-TRACK FACULTY DEPARTURES (88)

	NDC
Responding units with departures	33
Total number of departures	41
<b>Reason for Departure (percent)</b>	
Retired	43.9%
Deceased	2.4%
Other ac position	29.3%
Non-ac position	0.0%
Changed to PT	2.4%
Other reason	22.0%
Reason unknown	0.0%

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

	Overall	Public	Private	Non-Master's	Master's
Units responding	30	17	13	24	6
<b>Full Professor</b>					
Number of individual faculty	50	32	18	28	22
Median Salary	104,315	104,315	106,376	102,456	109,805.50
<b>Associate Professor</b>					
Number of individual faculty	47	29	18	32	15
Median Salary	88,090	88,506	87,239.50	85,046	95,900
<b>Assistant Professor</b>					
Number of individual faculty	65	50	15	46	19
Median Salary	81,000	80,502	81,000	78,147.50	89,527
<b>Other</b>					
Number of individual faculty	22	20	2	7	15
Median Salary	61,195	60,500	*	60,000	61,465

\*\*To protect privacy of respondents, value omitted due to small sample size

**TABLE F10. FACULTY SALARIES (FROM AGGREGATE SALARY DATA)**

	Overall	Public	Private	Non-Master's	Master's
Units responding	81	38	43	58	23
<b>Full Professor</b>					
Units responding	68	31	37	45	23
Average of Median Salary	105,279	99,786	110,029	101,268	113,301
<b>Associate Professor</b>					
Units responding	61	30	31	40	21
Average of Median Salary	90,520	89,177	91,819	87,701	95,889
<b>Assistant Professor</b>					
Units responding	67	34	33	45	22
Average of Median Salary	76,395	72,523	80,619	75,852	77,482
<b>Other</b>					
Units responding	29	19	10	11	18
Average of Median Salary	54,234	52,913	56,083	54,439	54,069

case for many years, most units report aggregated salary data. This year, 37% reported individual salary data, while last year 44% did so. Table F9 shows the median salaries at each rank for those faculty from those units that reported individual salaries. These values are true medians of the aggregate faculty at each rank among these 30 units.

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, when 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 individual faculty salaries nor true averages of all individual faculty salaries. They also are more sensitive to a very high or very low salary in a unit with a small number of faculty at a given rank, and Table F2 indicates that a typical academic unit 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 academic units that have graduate programs as compared with those having only undergraduate programs. This year, there were higher values for academic units at private universities as compared with those at public universities at all tenure-track ranks. Last year, this comparison did not hold at the associate professor level.

## CONCLUDING REMARKS

Once again, we have documented increases in bachelor's degree production and increases in enrollment in computing. These increases hold both in aggregate across the five computing disciplines that we studied, and in computer science, where we have the largest number of respondents. There has been a definite increase in gender and ethnic diversity in the bachelor's degrees awarded during the past four years to respondents of the NDC Study.

Faculty recruiting success was comparable to that reported by NDC units last year, with about three out of every four tenure-track faculty positions filled during the past recruiting cycle. This is close to what took place for doctoral-granting units as reported in the CRA Taulbee Survey. However, there was an increase this year in the fraction of faculty departures for other faculty positions. Faculty size, in both tenure-track faculty and part-time and adjunct faculty, also was comparable to last year's figures, allowing for the year-to-year changes in those units reporting to the survey. Thus, there appears to be more workload per faculty member again this year.

While the data in this report comes from 187 academic units and 279 computing programs, there are many more units that did not respond to our survey. Thus, the results must be interpreted cautiously. As was mentioned in the introduction, we hope to be able to provide a much richer set of data about both degree production and enrollment in future years, based on the results of a pilot effort to obtain data in computer science. We expect to report on this more fully in next year's study.

## LIST OF 2018-2019 ACM-NDC PARTICIPATING ACADEMIC UNITS

Albright College; American University Department of Computer Science; Amherst College; Arcadia University Department of Computer Science & Mathematics; Arkansas State University Department of Computer & Information Technology; Ashland University Mathematics and Computer Science Department; Athens State University; Augsburg College; Azusa Pacific University; Baldwin Wallace University; Bard College at Simon's Rock; Benedictine College (KS); Benedictine University Department of Computer Science & Information Systems (IL); Bethany College; Bethel University Department of Math & Computer Science; Blackburn College; 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-East Bay Department of Mathematics and Computer Science; California State University-Monterey Bay College of Science; Calvin College Department of Computer Science;

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Canisius College Computer Science Department; Carleton College; Carroll College; Carthage College; Central College; City University of Seattle Technology Institute; Colby College; Colgate University; College of New Jersey Computer Science Department; College of the Holy Cross; Colorado Mesa University Department of Business; Columbia College; Columbus State University; Covenant College; Creighton University; CUNY John Jay College of Criminal Justice; Delaware State University Department of Computer & Information Sciences; Denison University; DePauw University; Dickinson College; Dordt College; East Tennessee State University; Eastern Mennonite University; Eastern Michigan University College of Arts & Sciences; Eastern Oregon University; Edinboro University of Pennsylvania; Elon University Computing Sciences Department; Evangel University; Fairleigh Dickinson University-Florham Campus; Faulkner University; Gallaudet University Information Technology Program; Gannon University College of Engineering and Business; George Fox University Department of Computer Science and Information Systems; Georgia College & State University; Gettysburg College; Gordon College; Governors State University Division of Computing Mathematics and Technology; Grand Valley State University; Grinnell College; Grove City College; Guilford College; Gustavus Adolphus College; Hanover College; Harvey Mudd College; Haverford College; Henderson State University; Hiram College; Hofstra University School of Engineering and Applied Science; Humboldt State University; Huntington University; Idaho State University College of Science and Engineering; Illinois Wesleyan University; Indiana University-Purdue University-Fort Wayne Department of Computer Science; Indiana Wesleyan University Division of Mathematics and Computer Information Sciences; Iona College; Ithaca College; Juniata College; Kalamazoo College; Kean University; Kennesaw State University College of Business - IS Program; Kutztown University of Pennsylvania; Lake Forest College; Lake Superior State University School of Mathematics & Computer Science; Le Moyne College; Lenoir-Rhyne University; Lewis & Clark College; Longwood University; Marlboro College; Marymount University; McKendree University; McNeese State University; Metropolitan State University; Miami University - College of Engineering & Computing CS & SE Department (OH); Middlebury College Department of Computer Science; Millersville University of Pennsylvania; Mills College - Department of Computer Science; Milwaukee School of Engineering EECs Department; Mississippi Valley State University; Missouri State University Department of Computer Science; Monmouth University; Montana Tech of the University of Montana Department of Computer Science; Moravian College and Moravian Theological Seminary; Mount Holyoke College; Muskingum University; New College of Florida Computer Science Program; New York Institute of Technology College of Engineering and Computing Sciences; Northern Kentucky University; Northern New Mexico College; Northwestern College (IA); Northwestern State University of Louisiana; Oberlin College; Ohio Wesleyan University; Oklahoma Christian University College of Engineering and Computer Science; Olivet Nazarene University; Park University; Pennsylvania State University-Penn State Dubois; Plymouth State University; Pomona College; Quinnipiac University School of Engineering; Radford University; Ramapo College of New Jersey; Regis University College of Computer & Information Sciences; Rider University; Rocky Mountain College; Roger Williams University; Rose-Hulman Institute of Technology Department of Computer Science and Software Engineering; Saint Xavier University; Seattle University; Shippensburg University of Pennsylvania; Siena College; Smith College; Southern

Connecticut State University; Southern Oregon University; St. Olaf College; State University of New York at Brockport; Stephen F. Austin State University; Stevenson University; SUNY College at Oswego; SUNY College at Plattsburgh; SUNY College at Potsdam; Thiel College; Trevecca Nazarene University - Skinner School of Business & Technology; Trinity College (CT); Trinity University (TX); United States Air Force Academy Department of Computer Science; University of Alaska Anchorage Department of Computer Science and Engineering; University of Central Oklahoma; University of Evansville; University of Hawaii at Hilo; University of Minnesota-Morris; University of Mount Union; 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 Puerto Rico, Rio Piedras Campus; University of South Carolina-Beaufort; University of Virginia's College at Wise; University of Washington Tacoma; University of Wisconsin-Oshkosh Department of Computer Science; University of Wisconsin-Oshkosh Department of Information Systems; University of Wisconsin-Platteville; Upper Iowa University School of Science and Mathematics; Valley City State University; Valparaiso University Department of Mathematics & Computer Science; Villanova University Department of Computing Sciences; Virginia Wesleyan University; Walla Walla University Department of Computer Science; Washington College; Wellesley College; West Virginia State University; Western Carolina University; Western Connecticut State University - Department of Computer Science; Western Washington University; Wheaton College (IL); Whitworth University; William Penn University; Williams College; Wittenberg University; Xavier University of Louisiana; York College Pennsylvania Department of Engineering and Computer Science; York College Pennsylvania Information Technology Management Program. ❖

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