ACM-NDC Study 2016–2017:

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

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Between November 2016 and February 2017, ACM conducted its fifth annual survey of non-doctoral granting departments in computing (NDC). The survey compiles data about recent degrees, enrollments, faculty demographics, and faculty salaries, and includes gender and ethnic characteristics of the faculty and 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 NDC survey, with comparisons and contrasts to data reported in the Taulbee Survey and, as appropriate, last year's NDC survey results.

The survey conducted by ACM between November 2016 and February 2017—the fifth annual ACM-NDC Study (a survey of "Non-Doctoral-Granting Departments in Computing")—is intended to be an annual complement to the Computing Research Association (CRA) Taulbee Survey of Ph.D.-granting departments in computing [9]. ACM-NDC is funded by ACM and continues to be conducted with support from the CRA, AIS [3], and ACM SIGITE [2]. The authors of this article comprise 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 to 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 Ph.D.'s) in the five major computing disciplines in which curricular guidelines and accreditation criteria exist [1,4]: 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 November 2016 to qualifying programs identified using data in the Integrated Postsecondary Education Data System (IPEDS) [6]. These data are collected annually by the National Center for Education Statistics (NCES) from all U.S. institutions that participate in the federal financial aid programs [7]. This year the survey was distributed to 1,097 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. In total, 211 units participated in the survey, supplying either complete or partial information, with 177 units completing the survey in full. Of these, 168 supplied bachelor's data (compared to 121 in 2015-16) and data was reported for 312 total programs (260 bachelor's and 52 master's), compared to 233 last year. We found that 152 academic units provided data on faculty (131 in 2015-16) and 130 provided faculty salary information (72 in 2015-16).

Reversing a trend from the past two years, there was a significant increase in overall units and programs represented as well as in faculty data, including units providing salary information. Notably, there was a 38.8% increase in overall units participating, a 33.9% increase in the total number of programs participating, and a 38.8% increase in the number of bachelor's programs. In the faculty section, there was a marked 80.6% increase in the number of units supplying faculty salary information, a particularly encouraging improvement given the sensitivity of providing such information, and the added challenge of soliciting it from departments smaller than those found in the CRA Taulbee community. Unlike prior years when the survey was opened in the winter and closed in early spring, the 2016-17 NDC was released in the late fall and kept open into late winter, providing a wider window for responses. This was a deliberate decision by the NDC Committee to allow our respondents more time. Given the increased responses, we intend to continue opening the survey in the fall semester rather than the spring semester.

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 to those who rely on them.

Despite increased sample sizes in 2016-17 and greater overall awareness, 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 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). Last summer, the NDC Committee contacted non-responding institutions to learn how we can further add value and reduce existing barriers to participation. Each year, including this one, we continue to address some of these challenges, with improvements to validation and user interface, an increase in historical reference data, and some reduction in the overall length of the survey. After five years of data collection, it may be fair to conclude 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 [8]. While we felt that longitudinal trend analysis was premature in the past, we now have five years of data and may be in a better position for such examination; this is being considered for next year's report. 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 denote 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).
- A given academic unit may offer multiple programs.
- Degree production (master's and bachelor's) data refer to the previous academic year (2015-16).
- Data for current faculty as well as new students in all categories refer to the current academic year (2016-17) for which the survey is given.

BACHELOR'S DEGREE PRODUCTION AND ENROLLMENTS

The percentage of institutions responding this year to the bachelor's portion of the survey rose (15.3% vs. 11.3%) and a greater proportion of respondents was from public institutions (39.9% vs. 35.5%) than in 2015-16 (Table B1). The percentage of master's granting institutions changed only slightly (23.3% vs. 24.0%). Overall, the 260 programs represented in Table B2 are distributed in a similar manner as in 2015-16 among the various computing disciplines, with computer science programs representing the highest percentage (67.7%), followed by information systems (13.1%), information technology (10.0%), software engineering (5.4%), and computer engineering (3.8%). The small number of participants in all disciplines except CS should be considered when interpreting any data in the remaining bachelor's tables.

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

	Number of Programs	% of Total Responses
Yes	168	15.3%
No	929	84.7%
Total Surveys	1,097	
Public	67	39.9%
Private	101	60.1%
Total Yes	168	
Master's	39	23.2%
Non-Master's	129	76.8%
Total Yes	168	

As was the case in 2015-16, computer engineering programs report ABET accreditation at a rate of 100%. The percentage of ABET accredited programs rose in comparison to 2015-16 in CS (23.3% vs. 20.0%), IS (11.8% vs. 7.7%), IT (15.4% vs. 4.8%), and SE (35.7% vs. 22.2%). ABET accredited programs occur more frequently at public institutions than at private (except SE) and at master's granting institutions than at non-master's granting (except IT).

Table B3A shows actual degree production in 2015-16 and anticipated production for 2016-17 broken down by institution type for all survey respondents that provided projected degree data. Overall among the 126 units with CS programs, degree production in their 151 CS programs is projected to increase 16.0%. This same level of increase is expected among the 255 programs at the 144 units representing all disciplines. When broken out by institution type, however, significant differences are evident. Public institutions report an increase in anticipated degree production of 21.7% in CS and 19.9% over all disciplines, while private institutions report anticipated degree production growth of 10.4% in CS and 11.7% over all disciplines. The differences are less pronounced between master's granting vs. non-master's granting institutions in CS (14.9% vs. 16.8%) and over all disciplines (14.6% vs. 17.2%). By comparison, Taulbee institutions report a projected growth in CS degrees of 14.7% and 8.8% over all disciplines. Of note is that anticipated degree production for both NDC and Taulbee institutions is lower than that reported last year, when NDC reported anticipated growth of 24.7% in CS and 18.0% over all disciplines and the corresponding Taulbee projections were 25.8% in CS and 21.0% over all disciplines.

When considering actual growth in degree production, it is important to look only at respondents that reported actual degree production in consecutive years. For those institutions that responded to both this year's and last year's survey, Table B3B shows 2015-16 actual degree production broken out by institution type. Double-digit increases in CS degree production were reported by all institution types. The increases were higher than those reported last year for public (25.2% vs. 18.6%) and master's granting (20.3% vs. 15.3%) institutions, while lower increases were reported at private (12.9% vs. 16.4%) and non-master's granting (18.2% vs. 19.7%) institutions. Over all disciplines, an increase in degree production of 14.7% was lower than that reported by Taulbee institutions (16.7%). The largest increase in comparison to 2014-15 was at public institutions (21.7% vs. 15.6%). Private and non-master's granting institutions had lower rates of degree production in comparison to last year (6.5% vs. 19.6% and 14.6% vs. 22.2%, respectively).

Degree production and anticipated change data are broken out by discipline in table B4 for those units that provided both pieces of information. Among all of this year's respondents, degree production is anticipated to increase at higher rates than

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	147	176	67.7%	23.3%	62	62.0%	45.2%	114	71.3%	11.4%	43	55.1%	46.5%	133	73.1%	15.8%
CE	9	10	3.8%	100.0%	3	3.0%	100.0%	7	4.4%	100.0%	3	3.8%	100.0%	7	3.8%	100.0%
IS	33	34	13.1%	11.8%	15	15.0%	13.3%	19	11.9%	10.5%	17	21.8%	23.5%	17	9.3%	0.0%
IT	25	26	10.0%	15.4%	14	14.0%	21.4%	12	7.5%	8.3%	10	12.8%	10.0%	16	8.8%	18.8%
SE	13	14	5.4%	35.7%	6	6.0%	33.3%	8	5.0%	37.5%	5	6.4%	40.0%	9	4.9%	33.3%
Totals	**168**	**260**	**100%**	**24.6%**	**100**	**100%**	**38.0%**	**160**	**100%**	**16.3%**	**78**	**100%**	**38.5%**	**182**	**100%**	**78.0%**

TABLE B3A. DEGREE PRODUCTION AND ANTICIPATED CHANGE BY PROGRAM TYPE

	All Respondents													
	CS Only							All Disciplines						
	Number of Units	Number of Programs	2015-206 actual	2015-2016 Average per Unit	2016-2017 projected	2016-2017 Average per Unit	% change in average per Unit	Number of Units	Number of Programs	2015-2016 actual	2015-2016 Average per Unit	2016-2017 projected	2016-2017 Average per Unit	% change in average per Unit
Public	44	49	1,339	30.4	1,630	37.0	21.7%	52	82	1,986	38.2	2,381	45.8	19.9%
Private	82	102	1,407	17.2	1,554	19.0	10.4%	92	143	1,810	19.7	2,021	22.0	11.7%
Master's	29	37	1,228	42.3	1,411	48.7	14.9%	33	69	1,824	55.3	2,091	63.4	14.6%
Non-Master's	97	114	1,518	15.6	1,773	18.3	16.8%	111	156	1,972	17.8	2,311	20.8	17.2%
NDC Overall	126	151	2,746	21.8	3,184	25.3	16.0%	144	225	3,796	26.4	4,402	30.6	16.0%
Taulbee (US CS Depts)	131 (118*)	NA**	16,430	125.4	16,970	143.8	14.7%	156 (142*)	NA**	20,709	132.8	20,517	144.5	8.8%

*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

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

	All Respondents													
	CS Only							All Disciplines						
	Number of Units	Number of Programs	2014-2015 actual	2014-2015 Average per Unit	2015-2016 actual	2015-2016 Average per Unit	% change in average per Unit	Number of Units	Number of Programs	2014-2015 actual	2014-2015 Average per Unit	2015-2016 actual	2015-2016 Average per Unit	% change in average per Unit
Public	25	28	628	25.1	786	31.4	25.2%	26	42	912	35.1	1,110	42.7	21.7%
Private	41	54	630	15.4	711	17.3	12.9%	45	78	770	17.1	820	18.2	6.5%
Master's	13	19	487	37.5	586	45.1	20.3%	15	35	765	51.0	879	58.6	14.9%
Non-Master's	53	63	771	14.5	911	17.2	18.2%	56	85	917	16.4	1,051	18.8	14.6%
NDC Overall	66	82	1,258	19.1	1,497	22.7	19.0%	71	120	1,682	23.7	1,930	27.2	14.7%
Taulbee (US CS Depts)	NA	NA	NA		NA			120	NA*	16,467	137	19,219	160	16.7%

*Note: Note: Taulbee only provides averages per departmen

TABLE B4. DEGREE PRODUCTION AND ANTICIPATED CHANGE BY DISCIPLINE

	All Respondents						
	Number of Units	Number of Programs	2015-2016 actual	2015-20165 Average per Program	2016-2017 projected	2016-2017 Average per Program	2016-2017 Anticipated % Change
NDC Overall	144	225	3,796	16.9	4,402	19.6	16.0%
CS	126	151	2,746	18.2	3,184	21.1	16.0%
CE	7	8	136	17.0	150	18.8	10.3%
IS	28	29	433	14.9	439	15.1	1.4%
IT	22	23	338	14.7	437	19.0	29.3%
SE	13	14	143	10.2	192	13.7	34.3%

	Units Responding Both Years									
	Number of Units	Number of Programs	2014-2015 actual	2014-2015 Average per Program	2015-2016 actual	2015-2016 Average per Program	2015-2016 Actual % Change Program	2016-2017 projected	2016-2017 Average per Program	2016-2017 Anticipated % Change
NDC Overall	68	112	1,735	15.5	1,900	17.0	9.5%	2,234	19.9	17.6%
CS	34	78	1,227	15.7	1,469	18.8	19.7%	1,754	22.5	19.4%
CE	4	4	65	16.3	64	16.0	-1.5%	76	19.0	18.8%
IS	15	15	177	11.8	146	9.7	-17.5%	142	9.5	-2.7%
IT	9	9	162	18.0	172	19.1	6.2%	193	21.4	12.2%
SE	6	6	104	17.3	49	8.2	-52.9%	69	11.5	40.8%

last year in CE (10.3% vs. 6.6%) and IT (29.3% vs. -8.1%). Increases are also expected in CS and SE, but at a lower rate than those reported last year (16.0% vs. 25.7% in CS, and 34.3% vs. 39.6% in SE). Anticipated change in degree production in IS is slightly higher than last year (1.4% vs. 1.1%). When considering only those institutions responding to the NDC both this year and last year, anticipated change in degree production over all disciplines is higher than reported last year (17.6% vs. 15.9%). Anticipated degree production is expected to increase at rates higher than last year in CE (18.8% vs. 16.7%), IT (12.2% vs. -6.0%), and SE (40.8% vs. -16.5%). Degree production in CS is expected to grow at a rate of 19.4%, down from 24.8% last year. In IS, anticipated degree production is down (-2.7%), but at a rate significantly less dramatic than reported last year (-15.6%).

As shown in Table B5, female degree production at NDC schools was higher overall than at Taulbee institutions (20.5% vs. 18.1%). This difference is more pronounced in CS (22.1% vs. 17.9%) and CE (18.1% vs. 12.6%). These results differ from those presented last year when the percentage of female degree recipients over all disciplines in both surveys was equal (16.3%) and in CE, NDC institutions reported a lower percentage of female degree recipients than Taulbee (6.6% vs. 11.6%). As has been the case in the history of the NDC, private institutions report higher percentages of females than public institutions in CS, but lower percentages of females in SE. The representation of women among NDC bachelor's graduates this year is notably higher than that reported last year both overall (20.5% vs. 16.3%) and in CS (22.1% vs. 17.4%).

As can be seen in Table B6 and has consistently been the case, NDC reports higher percentages of degree production than Taulbee for Black/African American (6.1% vs. 4.0%) and White (64.6% vs. 50.5%) students and lower percentages for Asian (10.6% vs. 24.2%) and Non-Resident (6.7% vs. 9.4%) students. The percentage of Hispanic/Latino students at NDC in-

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	2,389	77.9%	676	22.1%	3,065	110	3,175	141	169
CS Public	1,331	83.5%	263	16.5%	1,594	108	1,702	52	58
CS Private	1,058	71.9%	413	28.1%	1,471	2	1,473	89	111
CS Master's	1,125	81.8%	250	18.2%	1,375	108	1,483	31	40
CS Non-Master's	1,264	74.8%	426	25.2%	1,690	2	1,692	110	129
CS Taulbee	14,259	82.1%	3,107	17.9%	17,366	1,588	18,954	NA	NA
CE Overall	127	81.9%	28	18.1%	155	0	155	9	10
CE Public	63	85.1%	11	14.9%	74	0	74	3	3
CE Private	64	79.0%	17	21.0%	81	0	81	6	7
CE Master's	58	86.6%	9	13.4%	67	0	67	3	3
CE Non-Master's	69	78.4%	19	21.6%	88	0	88	6	7
CE Taulbee	2,103	87.4%	304	12.6%	2,407	204	2,611	NA	NA
IS Overall	348	80.6%	84	19.4%	432	2	434	31	32
IS Public	263	82.2%	57	17.8%	320	2	322	13	13
IS Private	85	75.9%	27	24.1%	112	0	112	18	19
IS Master's	214	79.9%	54	20.1%	268	2	270	14	15
IS Non-Master's	134	81.7%	30	18.3%	164	0	164	17	17
IT Overall	406	84.6%	74	15.4%	480	0	480	24	25
IT Public	172	86.0%	28	14.0%	200	0	200	13	13
IT Private	234	83.6%	46	16.4%	280	0	280	11	12
IT Master's	163	84.9%	29	15.1%	192	0	192	9	10
IT Non-Master's	243	84.4%	45	15.6%	288	0	288	15	15
SE Overall	129	90.8%	13	9.2%	142	1	143	13	14
SE Public	57	89.1%	7	10.9%	64	1	65	6	6
SE Private	72	92.3%	6	7.7%	78	0	78	7	8
SE Master's	59	89.4%	7	10.6%	66	1	67	5	5
SE Non-Master's	70	92.1%	6	7.9%	76	0	76	8	9
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 (160 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	297	14	375	16	217	2,292	97	238	3,546	437	404	4,387
	8.4%	0.4%	10.6%	0.5%	6.1%	64.6%	2.7%	6.7%	100.0%			
CS	193	10	269	12	115	1,608	74	166	2,447	344	384	3,175
	7.9%	0.4%	11.0%	0.5%	4.7%	65.7%	3.0%	6.8%	100.0%			
CE	9	0	24	0	7	63	6	8	117	38	0	155
	7.7%	0.0%	20.5%	0.0%	6.0%	53.8%	5.1%	6.8%	100.0%			
IS	43	2	38	1	46	250	8	21	409	13	12	434
	10.5%	0.5%	9.3%	0.2%	11.2%	61.1%	2.0%	5.1%	100.0%			
IT	50	2	37	3	47	253	7	41	440	33	7	480
	11.4%	0.5%	8.4%	0.7%	10.7%	57.5%	1.6%	9.3%	100.0%			
SE	2	0	7	0	2	118	2	2	133	9	1	143
	1.5%	0.0%	5.3%	0.0%	1.5%	88.7%	1.5%	1.5%	100.0%			
Taulbee Overall	1,686	66	4,851	46	795	10,134	587	1,895	20,060	852	4,596	25,508
	8.4%	0.3%	24.2%	0.2%	4.0%	50.5%	2.9%	9.4%	100.0%	-	-	-

stitutions this year was the same as that at Taulbee institutions (8.4%); in last year's survey, NDC reported 8.6% vs. 8.1% reported by Taulbee.

Changes in mean CS enrollment between 2015-16 and 2016-17 broken out by institution type are reported in Table B7. Across all respondents, mean enrollment increased by 4.8%, a decrease over last year (5.7%). Private institutions experienced a higher increase than publics (6.4% vs. 3.7%), but the difference was much smaller than that reported last year (14.5% private vs. 3.0% public). Non-master's granting institutions saw a decrease in mean enrollment (-11.3%), while mean enrollment at master's granting institutions remained flat. Last year, these percentages favored non-master's granting institutions (3.9% vs. -4.0%).

We see in Table B7 the unusual phenomenon that, overall, there was an increase in mean enrollment per institution from those reporting in 2015-16 to those reporting in 2016-17, while there was not an increase in mean enrollment when the comparison is made among reporting master's institutions, nor when the comparison is made among reporting non-master's institutions. This is due to year-to-year differences in the set of institutions responding to the survey. This year, master's institutions comprised over 21% of the total respondents, while last year they comprised only 14%. Master's institutions tend to have much larger average enrollments than non-master's institutions. So, having a greater fraction of respondents from large programs can cause an overall increase in total enrollment per respondents, even when the averages do not increase either from these large programs or from the smaller programs from non-master's institutions.

The enrollment comparisons from year to year look considerably different when attention is restricted to only those institutions responding both years. For these institutions, there are enrollment increases for each institution type. Public institutions experienced a higher increase in mean enrollment than privates (17.5% vs. 8.6%). The year-to-year increase for publics

TABLE B7. COMPUTER SCIENCE ENROLLMENT CHANGE BY INSTITUTION TYPE

	All Respondents							Units Responding Both Years					
	2015-2016			2016-2017					2015-2016		2016-2017		
	Number of Units	Headcount	Mean Enroll	Number of Units	Headcount	Mean Enroll	% Increase	Number of Units	Headcount	Mean Enroll	Headcount	Mean Enroll	% Increase
NDC Overall	106	12,752	120.3	134	16,904	126.1	4.8%	65	8,156	125.5	9,333	143.6	14.4%
Public	37	8,216	222.1	47	10,825	230.3	3.7%	25	5,332	213.3	6,267	250.7	17.5%
Private	69	4,536	65.7	87	6,079	69.9	6.4%	40	2,824	70.6	3,066	76.7	8.6%
Master's	15	4,236	282.4	29	8,193	282.5	0.0%	13	3,941	303.2	4,364	335.7	10.7%
Non-Master's	91	8,516	93.6	105	8,711	83.0	-11.3%	52	4,215	81.1	4,969	95.6	17.9%
Taulbee	141*	105,148	745.7	NA**	NA**	NA**	NA**	NA**	NA**	NA**	NA**	NA**	NA**

*Note: Number of units responding to Taulbee.
**Note: Taulbee enrollment data is reported for previous year and for all respondents only

was 5.1% higher than reported last year and that for privates was 16.1% higher. Non-master's granting institutions had a higher increase in mean enrollments than master's granting (17.9% vs. 10.7%), with the year-to-year increase for non-master's granting being 21.2% higher than reported last year and that for master's granting 3.8% lower.

Change in mean bachelor's enrollment for the last year is broken out by discipline in Table B8. This discussion focuses on those programs responding both years as they provide more reliable information. For all disciplines combined, the increase in mean enrollment was higher than reported last year (9.1% vs. 6.6%). Increases at higher percentages were reported this year than were reported last year in CS (9.6% vs. 5.5%) and SE (17.7% vs. 2.8%). Units with IS programs reported an increase in mean enrollment this year (8.4%) after having reported a decrease in mean enrollment last year (-10.2%). In IT programs, an increase was reported this year, but at a lower percentage than last year (8.7% vs. 23.4%). CE continued to report a decline in mean enrollment and at a higher rate than last year (-3.5% vs. -2.7%).

Table B9 shows average majors per program and average new majors per program, broken out by program type and discipline. Also in this table is the ratio between average new majors per program and average majors per program, labeled average percentage of new majors per program. The one-year change in the fraction of majors that are new is an indicator of the likely direction of change in overall majors in upcoming years. For all disciplines and program types combined, the percentage of new majors per program increased over last year (31.1% vs. 30.6%), with increases in CS (32.1% vs. 30.4%), CE (29.3% vs. 28.4%), and IT (27.2% vs. 26.1%), while decreases were observed in both IS (29.1% vs. 33.2%) and SE (32.9% vs. 38.7%). Note that the number of programs from which the two averages in this ratio is computed are, in general, not equal. Therefore, this is only an approximation to the true average percentage per program.

MASTER'S DEGREE PRODUCTION AND ENROLLMENTS

In 2016-17, 31 distinct academic units reported on a total of 52 master's programs in computing, up from last year's 28 units and 40 programs, respectively. Of the 31, 20 were in public and 11 in private academic units (Tables M1-M2). They accounted for 26 programs in computer science, one in computer engineering, ten in information systems, nine in information technology,

TABLE B8. ACTUAL ENROLLMENT CHANGE FROM PREVIOUS YEAR BY DISCIPLINE

	All Respondents			Units Responding Both Years		
	2014-2015	2015-2016	% Change in Mean per Program	2014-2015	2015-2016	% Change in Mean per Program
All Disciplines						
# Units	115	152	32.2%	68	68	0.0%
# Programs	185	242	30.8%	114	114	0.0%
BS enrollment	18,801	24,046	-2.2%	11,101	12,107	9.1%
CS						
# Units	106	134	26.4%	64	64	0.0%
# Programs	124	162	30.6%	77	77	0.0%
BS enrollment	12,752	16,904	1.5%	8,129	8,911	9.6%
CE						
# Units	6	8	33.3%	4	4	0.0%
# Programs	6	9	50.0%	4	4	0.0%
BS enrollment	849	817	-35.8%	492	475	-3.5%
IS						
# Units	26	31	19.2%	16	16	0.0%
# Programs	26	32	23.1%	16	16	0.0%
BS enrollment	1,734	2,329	9.1%	751	814	8.4%
IT						
# Units	17	24	41.2%	10	10	0.0%
# Programs	20	25	25.0%	11	11	0.0%
BS enrollment	2,124	2,968	11.8%	1,424	1,548	8.7%
SE						
# Units	8	13	62.5%	6	6	0.0%
# Programs	9	14	55.6%	6	6	0.0%
BS enrollment	1,342	1,028	-50.8%	305	359	17.7%

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

	Majors	New Majors	# Programs Reporting Majors	# Programs Reporting New Majors	Avg. Majors per Program	Avg. New Majors per Program	Avg. % New Majors per Program
CS Overall	16,904	4,929	162	147	104.3	33.5	32.1%
CS Public	10,825	2,989	53	47	204.2	63.6	31.1%
CS Private	6,079	1,940	109	100	55.8	19.4	34.8%
CS Master's	8,193	2,303	38	34	215.6	67.7	31.4%
CS Non-Master's	8,711	2,626	124	113	70.3	23.2	33.1%
CE Overall	817	213	9	8	90.8	26.6	29.3%
CE Public	417	123	2	2	208.5	61.5	29.5%
CE Private	400	90	7	6	57.1	15.0	26.3%
CE Master's	479	141	3	3	159.7	47.0	29.4%
CE Non-Master's	338	72	6	5	56.3	14.4	25.6%
IS Overall	2,329	657	32	31	72.8	21.2	29.1%
IS Public	1,866	493	13	12	143.5	41.1	28.6%
IS Private	463	164	19	19	24.4	8.6	35.4%
IS Master's	1,498	413	15	14	99.9	29.5	29.5%
IS Non-Master's	831	244	17	17	48.9	14.4	29.4%
IT Overall	2,968	776	25	24	118.7	32.3	27.2%
IT Public	1,247	526	13	13	95.9	40.5	42.2%
IT Private	1,721	250	12	11	143.4	22.7	15.8%
IT Master's	1,037	459	10	10	103.7	45.9	44.3%
IT Non-Master's	1,931	317	15	14	128.7	22.6	17.6%
SE Overall	1,028	314	14	13	73.4	24.2	32.9%
SE Public	575	171	6	5	95.8	34.2	35.7%
SE Private	453	143	8	8	56.6	17.9	31.6%
SE Master's	589	172	5	4	117.8	43.0	36.5%
SE Non-Master's	439	142	9	9	48.8	15.8	32.3%
NDC Overall	24,046	6,889	242	223	99.4	30.9	31.1%
Taulbee	NA*	32,216	NA**	137**	NA*	235.2**	NA*

*Note: Taulbee does not report total enrollment for current year
**Note: Taulbee only reports by department, not by program

and six 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 M3 shows actual degree production in 2015-16 and anticipated change in that production for 2016-17 broken down by institution type. Those institutions responding to this year's survey anticipate an overall 16.8% decrease in the production of master's degrees in 2016-17 over those granted in 2015-16 (Table M3). CS programs anticipate a 27.4% decrease. In comparison, Taulbee respondents reported an overall expected decrease per department of 10.4%, and Taulbee US CS academic units reported an expected decrease per unit of 11.6% in CS master's degrees. Further analysis reveals that although two larger programs contributed significantly to the overall (and CS) decline in anticipated degree production, projecting only 61.4% and 50.2% of the number of graduates for 2016-17, roughly half of all master's programs anticipated at least some decline in degree production. This is the opposite of the 7.3% overall anticipated increases projected by last year's respondents (including a 3.8% increase in CS). However, due to the very small sample size, no conclusions should be drawn.

Among the 2015-16 master's degree graduates, 25.9% were female, compared to 29.4% at Taulbee schools (Table M4). CS, the discipline with the largest response size, reported 23.9% female graduates, compared to 25.2% reported by Taulbee CS master's programs. Taulbee's Information ("I") programs reported that 47.9% of their master's degrees were awarded to females compared to 32.8% of IS and IT master's degrees at NDC programs.

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 (3.9%

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

	Number of Units	% of Total Responses
Public	20	67.9%
Private	11	32.1%
Total Units Proving Data	31	

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	25	26	50.0%	18	72.0%	8	29.6%
CE	1	1	1.9%	1	4.0%	0	0.0%
IS	7	10	19.2%	3	12.0%	7	25.9%
IT	5	9	17.3%	2	8.0%	7	25.9%
SE	5	6	11.5%	1	4.0%	5	18.5%
Totals	31	52		25		27	

TABLE M3. DEGREE PRODUCTION AND ANTICIPATED CHANGE BY DISCIPLINE

	2015-2016				2016-2017				% change
	Number of Units	Number of Programs	Actual	Per Program	Number of Units	Number of Programs	Projected	Per Program	
NDC Overall	31	50	2,325	44.7	31	50	1,858	37.2	-16.8%
CS	25	26	1,841	70.8	25	26	1,336	51.4	-27.4%
CE	1	1	42	42	1	1	70	70	66.7%
IS	7	9	133	14.8	7	9	147	16.3	10.1%
IT	5	8	141	17.6	5	8	143	17.9	1.7%
SE	5	6	168	28	5	6	162	27	-3.6%

TABLE M4. MASTER'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	1,398	76.1%	439	23.9%	1,837	4	1,841	25	25
CS Public	1,258	77.3%	369	22.7%	1,627	4	1,631	17	18
CS Private	140	66.7%	70	33.3%	210	0	210	7	7
CS Taulbee	8,041	74.8%	2,715	25.2%	10,756	483	11,239	N/A	N/A
CE Overall	26	61.9%	16	38.1%	42	0	42	1	1*
CE Public	26	61.9%	16	38.1%	42	0	42	1	1*
CE Private	0	0.0%	0	0.0%	0	0	0	0	0
CE Taulbee	562	78.6%	153	21.4%	715	22	737	N/A	N/A
IS Overall	80	60.2%	53	39.8%	133	0	133	7	9
IS Public	48	64.9%	26	35.1%	74	0	74	3	3
IS Private	32	54.2%	27	45.8%	59	0	59	6	7
IT Overall	104	73.8%	37	26.2%	141	0	141	5	9
IT Public	17	68.0%	8	32.0%	25	0	25	2	2
IT Private	87	75.0%	29	25.0%	116	0	116	3	6
"I" Taulbee	1,401	52.1%	1,288	47.9%	2,689	66	2,755	N/A	N/A
SE Overall	111	66.1%	57	33.9%	168	0	168	5	6
SE Public	49	73.1%	18	26.9%	67	0	67	1	1*
SE Private	62	61.4%	39	38.6%	101	0	101	4	5
NDC Overall	1,719	74.1%	602	25.9%	2,321	4	2,325	31	49
Taulbee Overall	10,004	70.6%	4,156	29.4%	14,160	571	14,731	N/A	N/A

*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 (28 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	47	1	229	0	45	246	8	619	1,195	59	1,071	2,325
	3.9%	0.1%	19.2%	0.0%	3.8%	20.6%	0.7%	51.8%	100.0%			
Taulbee Overall	241	26	907	9	199	2,510	99	9,665	13,656	381	694	14,731
	1.8%	0.2%	6.6%	0.1%	1.5%	18.4%	0.7%	70.8%	100.0%			

TABLE M6. ACTUAL ENROLLMENT CHANGE FROM PREVIOUS YEAR BY DISCIPLINE

	All Respondents									Units Responding Both Years								
	2014-2015				2015-2016					2014-2015				2015-2016				
	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	Number of Units	Number of Programs	Headcount	Mean Enroll	% Change in Mean per Program
CS	22	23	3,024	131.5	25	26	3,126	120.2	-8.6%	12	12	2,562	213.5	12	12	2,299	191.6	-10.3%
CE	2	2	216	108.0	1	1	185	185.0	71.3%	1	1	181	181.0	1	1	185	185.0	2.2%
IS	5	5	218	43.6	7	10	397	39.7	-8.9%	4	4	209	52.3	4	4	176	44.0	-15.8%
IT	2	2	87	43.5	5	9	471	52.3	20.3%	1	1	17	17.0	1	1	42	42.0	147.1%
SE	5	5	205	41.0	5	6	346	57.7	40.7%	3	3	154	51.3	3	3	163	54.3	5.8%
NDC Overall	26	37	3,750	101.4	31	52	4,525	87.0	-14.1%	15	21	3,123	148.7	15	21	2,865	136.4	-8.3%

vs. 1.8%), Black/African-American resident graduates (3.8% vs. 1.5%), Asian (19.2% vs. 6.6%) and White graduates (20.6% vs. 18.4%). There was a much smaller percentage of non-resident graduates at NDC institutions than at Taulbee (51.8% vs. 70.8%). It's useful to note that only 7.3% of all Taulbee master's graduates were marked as residents of unknown ethnicity or students of unknown residency. For NDC, the number is 46%, again suggesting that gathering ethnicity/residency data is a challenge at NDC programs (a similar gap was observed last year).

Overall enrollment at NDC master's programs reporting this year was 4,525, which represents a 20.7% increase in headcount over last year, but the 87.0 mean enrollment per program is a 14.1% decrease from that reported by last year's respondents (Table M6). Mean enrollment per program decreased 8.6% decrease in CS. When only those programs that responded both years are considered, the overall enrollment decrease is 8.3% across all disciplines, with CS programs showing a 10.3% decrease.

FACULTY DEMOGRAPHICS

The average faculty size for this year's responding academic units was 11.2, with an average 9.4 FTE (Table F1). Each of these values is lower than last year's (12.3 and 9.9, respectively). These declines probably reflect the specific set of units reporting this year as compared with last year. This year we have over 150 units responding, fifteen percent more than last year.

The average number of tenure-track faculty per unit increased to 5.5 (5.4 FTE) from 5.3 (5.2 FTE) last year, but the average number of part-time/adjunct faculty decreased to 4.3 (2.8 FTE) from 5.6 (3.4 FTE) last year. The part-time/adjunct faculty values are comparable to those from two years ago. Tenure-track faculty comprise 57.2% of the total faculty FTE

TABLE F1. ACTUAL FACULTY SIZE 2015-2016

Faculty Type	Overall Avg HC	Overall % of HC Total	Overall Avg FTE	Overall % of FTE Total	Public FTE	Private FTE	UG Only FTE	UG+ grad FTE
# respondents	152		151		56	95	120	31
Tenure-track	5.5	49.3%	5.4	57.2%	57.8%	56.6%	72.2%	43.0%
Visiting	0.3	2.6%	0.3	2.8%	1.3%	4.5%	4.8%	1.0%
FT Non-TT	1	9.1%	1	10.1%	13.1%	7.0%	9.9%	10.2%
PT/Adjunct	4.3	38.9%	2.8	29.9%	27.9%	31.9%	13.1%	45.9%
Total	11.2		9.4					

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

Faculty Type	Overall	Overall %	Public	Private	UG Only	UG+grad
# respondents	147		53	94	117	30
Full Professor	2.1	38.9%	39.3%	38.5%	39.2%	38.3%
Associate Professor	1.7	31.3%	27.1%	35.2%	32.6%	29.0%
Assistant Professor	1.6	29.3%	32.8%	26.1%	28.0%	31.7%
Other	0	0.5%	0.8%	0.2%	0.2%	1.0%

TABLE F3. TENURE-TRACK FACULTY HEADCOUNT BREAKDOWN BY GENDER (131 units)

Gender	Full Prof	Assoc Prof	Asst Prof	Other T-T	Total T-T
Total Faculty	326	264	245	4	839
Male	77.6%	75.4%	71.8%	75.0%	75.2%
Female	21.5%	24.6%	28.2%	25.0%	24.4%
Not Reported	0.9%	0.0%	0.0%	0.0%	0.4%
Percent Female*	21.7%	24.6%	28.2%	25.0%	24.5%

* 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	315	252	234	4	805
Nonresident Alien	1.0%	2.8%	6.8%	0.0%	3.2%
American Indian/ Alaska Native	0.0%	0.0%	0.4%	0.0%	0.1%
Asian	19.4%	20.6%	20.9%	0.0%	20.1%
Black or African-American	0.3%	2.0%	0.9%	0.0%	1.0%
Native Hawaiian/ Pacific Islander	0.0%	0.4%	0.4%	0.0%	0.2%
White	70.5%	65.1%	61.1%	100.0%	66.2%
Multiracial, not Hispanic/Latino	0.0%	0.8%	0.9%	0.0%	0.5%
Hispanic/Latino, any race	2.9%	2.8%	3.0%	0.0%	2.9%
Resident, race/ ethnicity unknown	4.4%	4.0%	3.0%	0.0%	3.9%
Total Residency known	98.4%	98.4%	97.4%	100.0%	98.1%
Residency unknown	1.6%	1.6%	2.6%	0.0%	1.9%
Black+Hisp+ NatAm+ NatHaw+Multi*	3.2%	6.0%	5.7%	0.0%	4.8%

* as a percentage of those for whom residency is known

TABLE F5. FACULTY RECRUITING DURING 2014-2015 (61 units)

Faculty Type	Number Sought	Avg/Dept	Number Filled	Success Rate
Tenure-track	97	1.15	69	71.1%
Full Professor			1	
Associate Professor			8	
Assistant Professor			61	
Other			1	
Visiting	29	0.35	27	93.1%
FT Non-TT	34	0.4	31	91.2%
PT/Adjunct	88	1.05	83	94.3%

compared with 52.5% last year, while part-time/adjunct faculty comprise 29.9% of the total FTE compared to 34.0% last year. These directions of change are the opposite of those reported last year. The differences between public and private institution distributions of faculty are similar to those observed last year, with publics having slightly higher percentages of tenure-track and full-time non-tenure-track faculty, and smaller percentages of visiting and part-time/adjunct faculty on average than their private institution counterparts. This year, 45.9% of the faculty in units that offer master's programs were part-time/adjunct and 43.0% were tenure-track. These values are slightly higher than those from last year. Units with only undergraduate programs had a higher percentage of their faculty as tenure-track and a smaller percentage as part-time/adjunct as compared with last year.

The overall distribution of tenure-track faculty continues to be fairly even across ranks. At public institutions this year, there is a greater percentage of assistant professors and full professors, and a smaller percentage of associate professors, than there was last year. The distribution at private institutions was very close to that from last year. Units with master's programs also had a greater percentage of assistant professors and full professors, and a smaller percentage of associate professors, than there were last year (Table F2).

The percentage of female faculty decreased from 26.2% among last year's reporting units to 24.4% this year (Table F3). Decreased percentages were present at the assistant professor and associate professor ranks. Ethnic diversity in tenure-track faculty also appears to be somewhat less. This year, the total percentage of tenure-track faculty who are Black, Hispanic, Native American, Native Hawaiian/Pacific Islander, or Multiracial, as a percentage for whom residency is known, was 4.8 compared to 6.1 last year. Reductions in this percentage were present at all faculty ranks (Table F4). Only the Non-resident Alien and Hispanic/Latino categories demonstrated any appreciable increases. The overall percentage of Whites was up slightly.

This year's 88 respondents to the faculty recruiting question

TABLE F6. GENDER AND ETHNICITY OF NEWLY HIRED FACULTY (61 units)

Gender	Tenure-Track	% of Total
Male	57	77.0%
Female	17	23.0%
Unknown	0	0.0%
Ethnicity	**Tenure-Track**	**% of Total**
Nonresident Alien	9	12.2%
American Indian/Alaska Native	0	0.0%
Asian	24	32.4%
Black or African-American	0	0.0%
Native Hawaiian/Pacific Islander	1	1.4%
White	37	50.0%
Multiracial, not Hispanic/Latino	0	0.0%
Hispanic/Latino, any race	2	2.7%
Resident, race/ethnicity unknown	1	1.4%
Total Residency known	74	100.0%
Residency unknown	0	0.0%
Black+Hisp+NatAm+NatHaw+Multi	3	4.1%

TABLE F8. TENURE-TRACK FACULTY DEPARTURES (77 units)

	NDC
Responding departments with departures	37
Total number of departures	54
Reason for Departure (percent)	
Retired	42.6%
Deceased	1.9%
Other ac position	27.8%
Non-ac position	18.5%
Changed to PT	0.0%
Other reason	9.3%
Reason unknown	0.0%

sought a total of 97 tenure-track faculty members, and hired 69 for a success rate of 71.1% (Table F5). While lower than last year's 78.3% success rate, this year's rate is comparable to the 72.7% rate reported by doctoral-granting U.S. CS academic units in the Taulbee Survey. Women comprised 23.0% of the new hires for 2016-17, compared with 27.7% for 2015-16. There also was less ethnic diversity among the new hires. Only 4.1% of those new hires for whom residency is known are Black, Hispanic, Native American, Native Hawaiian/Pacific Islander, or Multiracial, as compared with 13.0% last year (Table F6). Though these year-to-year comparisons are disappointing, we caution that the small numbers of total hires in these categories, both individually and collectively, makes it risky to draw wider conclusions from these data. Both the gender and ethnicity percentages among the newly hired faculty at NDC units are comparable to those reported in the Taulbee Survey for newly hired faculty at the doctoral-granting units.

Table F7 shows the degree required for hiring and promotion of faculty at different ranks. As one would expect, these data do not change much from year to year. However, there ap-

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 (126)							
Doctoral	96.4%	91.4%	81.4%	20.4%	89.9%	96.3%	90.6%
Masters	3.6%	8.6%	18.6%	77.4%	10.1%	3.7%	9.4%
Bachelors	0.0%	0.0%	0.0%	2.2%	0.0%	0.0%	0.0%
Public (45)							
Doctoral	98.1%	94.4%	87.0%	15.1%	94.4%	100.0%	92.6%
Masters	1.9%	5.6%	13.0%	83.0%	5.6%	0.0%	7.4%
Bachelors	0.0%	0.0%	0.0%	1.9%	0.0%	0.0%	0.0%
Private (81)							
Doctoral	95.3%	89.5%	77.9%	23.8%	86.9%	94.0%	89.4%
Masters	4.7%	10.5%	22.1%	73.8%	13.1%	6.0%	10.6%
Bachelors	0.0%	0.0%	0.0%	2.4%	0.0%	0.0%	0.0%
UG only (96)							
Doctoral	95.5%	90.0%	79.1%	21.5%	88.9%	95.4%	89.9%
Masters	4.5%	10.0%	20.9%	75.7%	11.1%	4.6%	10.1%
Bachelors	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%
UG and Master's (28)							
Doctoral	100.0%	96.7%	90.0%	16.7%	93.3%	100.0%	93.3%
Masters	0.0%	3.3%	10.0%	83.3%	6.7%	0.0%	6.7%
Bachelors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

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

	Overall	Public	Private	UG Only	UG+grad
Units responding		17	12	21	8
Full Professor					
Number of individual faculty	52	35	17	30	22
Median Salary	103,364.50	99,362	109,956	105,810	100,809
Associate Professor					
Number of individual faculty	45	28	17	27	18
Median Salary	93,000	87,962.50	95,290	87,845	95,489
Assistant Professor					
Number of individual faculty	54	37	17	30	24
Median Salary	80,591.50	73,996	86,920	73,996	83,096.50
Other					
Number of individual faculty	28	15	13	9	19
Median Salary	59,779.50	56,454	72,000	62,000	57,559

TABLE F10. FACULTY SALARIES (FROM AGGREGATE SALARY DATA)

	Overall	Public	Private	UG Only	UG+grad
Departments responding	91	42	49	66	25
Full Professor					
Departments responding	75	37	38	51	24
Average of Median Salary	96,324	98,960	94,002	92,683	104,189
Associate Professor					
Departments responding	66	32	34	45	21
Average of Median Salary	84,840	83,023	86,553	82,324	90,471
Assistant Professor					
Departments responding	62	37	25	40	22
Average of Median Salary	71,936	75,592	67,272	69,281	77,247
Other					
Departments responding	41	24	17	24	17
Average of Median Salary	50,324	53,164	47,594	48,822	52,854

peared to be a greater percentage of this year's respondents who require the doctoral degree for hiring new assistant professors or full-time non-tenure-track faculty members, as compared with the corresponding percentages reported last year.

This year, respondents reported on departures for 54 faculty members, as compared with 31 departures reported last year. The distribution of these departures is shown in Table F8. Compared with the previous year, a higher fraction of this past year's departures left their former positions for other positions in academia. The Taulbee Survey also observed this in the doctoral-granting units. However, the NDC respondents did not report increased departures to industry as did the Taulbee Survey respondents.

FACULTY SALARIES

Units were given the option to report faculty salaries by individual faculty member (anonymized) or simply an aggregated median salary for each faculty rank. For the third year in a row, there was a smaller percentage of units who provided individual salary data (32% vs 38% last year). Table F9 shows the median salaries at each rank for those faculty from units that reported individual salaries. These values are true medians of the aggregate faculty at each rank among these 29 units.

Table F10 has the corresponding faculty salary information for all units that reported salary data. This includes those that reported aggregated salaries at each rank; it also includes those that reported individual salaries, as we computed 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 unit with a small number of faculty at a given rank, and Table F2 indicates that a typical 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 was observed last year, the average of the median salaries is higher at all ranks for those units that have graduate programs as compared with those having only undergraduate programs. We also see higher values at public institutions than at private institutions, except at the associate professor level. Last year, public institution values exceeded those at private institutions at all ranks.

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's degrees in each area of computing. It is encouraging to see increased gender diversity in the CS bachelor's graduates. These NDC trends are also observed in the doctoral-granting academic units reported in the CRA Taulbee Survey, and collectively illustrate the pervasiveness of interest in our discipline.

The ability of our academic units to effectively handle continued growth is challenged by the very slow growth in faculty in comparison with that of students. 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 [5]. These problems will be exacerbated if there is a greater tendency of faculty to leave their current positions for other academic positions, as is suggested by this year's data in both the NDC and Taulbee surveys. Unit and institution administrations will need to work together to address these matters.

If your program participated in the 2016-17 ACM-NDC study, thank you for your help. The 2017-18 survey will go out to qualifying programs in the fall of 2017 (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 2016-17 ACM-NDC PARTICIPATING ACADEMIC UNITS[1]

Albright College; Amherst College; Arcadia University; Arkansas State University; Arkansas Tech University; Augsburg College; Avila University; Baldwin Wallace University; Baylor University; Beloit College; Bemidji State University; Benedictine College; Bethany College; Blackburn College; Bowling Green State University; Bryn Mawr College; Buena Vista University; Butler University; Cabrini College; California State University-Fullerton; California State University-East Bay; Calvin College; Canisius College; Capital University; Carleton College; Carroll College; Central College; Central Connecticut State University; Champlain College; City University of Seattle Technology Institute; Claflin University; Clayton State University; Colgate University; College of New Jersey; College of the Holy Cross; Columbia College; Columbus State University; Covenant College; CUNY John Jay College of Criminal Justice; Denison University; DePauw University; Dickinson College; Dickinson State University; Dillard University; Drury University; East Tennessee State University; Eastern Mennonite University; Elizabethtown College; Fairleigh Dickinson University-Florham; Florida Memorial University; Florida Polytechnic University; Florida Southern College; Gallaudet University; Georgia College & State University; Georgia Regents University; Gordon College; Grambling State University; Grand Valley State University; Grinnell College; Hampshire College; Harvey Mudd College; Haverford College; Henderson State University; Hendrix College; Hiram College; Hofstra University; Howard Payne University; Huntington University; Idaho State University; Illinois State University; Illinois Wesleyan University; Indiana State University; Indiana University of Pennsylvania; Indiana University-Purdue; Indiana Wesleyan University; Iona College; Ithaca College; Juniata College; Kalamazoo College; Kean University; Kutztown University of Pennsylvania; Lake Forest College; Lake Superior State University; Lamar University; Le Moyne College; LeTourneau University; Lewis & Clark College; Lincoln University; Longwood University; Macalester College; Marlboro College; Marymount University; Marywood University; Miami University; Milwaukee School of Engineering; Mississippi Valley State University; Missouri State University; Monmouth University; Montana Tech; Mount Holyoke College; Mount St. Mary's University; Muhlenberg College; New College of Florida; Northern Michigan University; Northern New Mexico College; Northwestern State University of Louisiana; Oberlin College; Ohio Northern University; Ohio Wesleyan University; Oklahoma Christian University; Olin College of Engineering; Olivet College; 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; Principia College; Providence College; Purdue University Northwest; Ramapo College of New Jersey; Regis University; Rhodes College; Roger Williams University; Rose-Hulman Institute; Rowan University; Roy G. Perry College of Engineering; Prairie View A&M University; Rutgers University-Camden; San Diego State University; Seattle University; Siena College; Siena Heights University; Slippery Rock University; Smith College; South Dakota; Southern Connecticut State University; Southern Oregon University; Southwestern University; St. Cloud State University; State University of New York at Brockport; Stephen F. Austin State University; Stonehill College; SUNY at Fredonia; The College of Wooster; Thiel College; Thomas College; Thomas More College; Tougaloo College; Trinity College; Tusculum College; Union College (NY); University of Akron; University of Central Missouri; University

[1] List includes schools that touched or partially completed NDC as well as those completing the study in full.

of Central Oklahoma; University of Evansville; University of Hartford; University of Hawaii; University of Houston; University of Louisiana; University of Minnesota; University of Nebraska; University of New Haven; University of North Carolina at Greensboro; University of Portland; University of Puerto Rico; University of Sioux Falls; University of South Carolina; University of Washington; University of Wisconsin; Ursinus College; Utah Valley University; Valdosta State University; Valley City State University; Villanova University; Wartburg College; Wellesley College; Wentworth Institute of Technology; West Virginia State University; Western Carolina University; Western State Colorado University; Wheaton College (IL); Whitworth University; William Penn University; Williams Baptist College; Williams College; Wittenberg University; Worcester State University; Xavier University ❖

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