

**College of Engineering**

**Diversity and Inclusion**

**Demographic Data Summary**

**Diversity Working Group**  
**College of Engineering, University of Delaware**

September 2017

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## **1. Introduction**

This report summarizes diversity for the UD College of Engineering as of September 2017. It was extracted from the *College of Engineering Strategic Plan for Diversity and Inclusion*, which is available in full at <https://www.engr.udel.edu/initiatives/diversity-inclusion/>. Further discussion is available the strategic plan, the data is summarized here for convenience and with the intent to serve as a first annual report intended to help assess progress towards diversity and inclusion goals and to identify successes and shortcomings.

Note that although the College seeks diversity and inclusion in all forms, this report focuses on diversity with respect to women and underrepresented groups (URGs, defined as non-White, non-Asian), for which the College has particularly obvious deficiencies and for which data are relatively available. We fully expect that many other groups (e.g., those based on gender identity, religion, physical capability) will benefit from these initial efforts. In fact, since many of the tasks involve simply implementing best practices, they should be beneficial to College operations in general.

## **2. Diversity and inclusion goals**

Based on analyses of the current status of diversity and inclusion in each group, and review of the literature and best practices, we defined our ultimate goals, and each of the College four diversity and inclusion working group defined five-year goals as well. They are assembled here for convenience.

Many issues were considered in defining these goals. We considered goals related to demographics, possible disparities among groups in retention rates or ranks, and inclusiveness of the climate. These three types of goals are related but not the same. It is possible to have diversity in numbers and still lack a fully inclusive environment, for example. For the demographics, we considered goals both in absolute terms and relative to other universities. The former is what determines if critical mass exists and is most relevant for the benefits diversity and inclusion are meant to achieve. The latter is relevant to help benchmark progress since we recognize the College is influenced by the context and social dynamics of the country. We also considered the timing of achieving goals. We wanted to specify a timeline for goals as much as possible to ensure the urgency exists to make progress given the College's other pressing issues. However, we also recognize that changes in demographics are limited by the turnover rates of each group. Every four years, the undergraduate student body is entirely renewed. Graduate students typically remain in the College for two to five years. Changes in graduating classes then, must be reflected to a large extent in the incoming class approximately four years prior. For faculty and staff, only a small portion leave and are hired each year, so changes in overall demographics are necessarily slow. For these reasons, we are interested both in incoming and overall demographic numbers. We considered goals at the College level, but recognizing the heterogeneity of departments, at the department level as well. We also need to be cognizant of the natural variability that results from the relatively small numbers in some groups. Thus, we realize that we must be careful not to interpret normal variability as either positive or negative trends. Finally, there are multiple ways to partition each group that may be of interest. For example, by type (tenured/tenure-track vs. continuing track) and rank for faculty; by domestic vs. international for graduate students. In defining goals, we sought to be careful and specific to capture the issues necessary to achieve the benefits of inclusive excellence while remaining as simple and focused as possible to facilitate communication and assessment of progress. With all these ideas in mind, the ultimate and five-year goals, described more fully in the attachments, are as follows (Figures 1 and 2).

<b>ULTIMATE GOALS</b>	
To fully achieve inclusive excellence, our ultimate goals are for the College to have:	
<ul style="list-style-type: none"> <li>• Demographics similar to the national population</li> <li>• No disparities between racial, gender, or other groups in retention rates or across ranks, and</li> <li>• An inclusive, supportive climate in which all members of the community can thrive</li> </ul>	

Figure 1. Ultimate goals for College diversity and inclusion

<b>FIVE-YEAR GOALS</b>			
	Demographics for each department and for the College as a whole	Disparities (racial, gender) for the College as a whole	Climate
Faculty	25% women 10% URGs	<ul style="list-style-type: none"> <li>• No disparities in retention rates</li> <li>• Continuous improvement towards no disparities in T/TT vs. CT, and in distribution across ranks</li> </ul>	Inclusive, supportive
Graduate students	Among incoming students: 33% women 25% URGs (among domestic)	No disparities in retention rates	Inclusive, supportive
Undergraduate students	Among incoming students: 30% women 15% URGs	No disparities in 6-year graduation rates (70% for all)	Inclusive, supportive
Staff	30% women on technical staff 20% URGs on all staff 20% men on administrative staff	Continuous improvement towards no disparities in managerial vs. non-managerial	Inclusive, supportive

Figure 2. Five-year goals for College diversity and inclusion

Note that we have not made relative ranking compared to other universities an official goal because absolute demographic goals are more relevant for realizing the benefits of diversity and inclusiveness, and because data availability in measuring progress towards relative ranking goals requires using rates for graduating students, which have a time delay and thus are more difficult to achieve as five-year goals (unlike incoming students). Nevertheless, we intend to track demographics relative to other universities, with an aim to have every department and the College as a whole be in the 75<sup>th</sup> percentile in terms of percentage of women and percentage of people from URGs at all levels.

**3. Faculty data**

This section presents a current measure of faculty diversity in the College of Engineering, as well as a 10-year historical view. It includes two analyses: (1) comparison to other universities by department and over a 10-year period, considering only tenured/tenure-track (T/TT) faculty due to data limitations, and (2) a more detailed analysis of the UD College of Engineering faculty as of June 2017. The first analysis is based on data from the American Society for Engineering Education (ASEE) (Section 3.1); the second on internal UD data (Section 3.2). In both cases, the data are evaluated in terms of percentage of women faculty and percentage of faculty from URGs. Although we recognize that there are both similarities and important distinctions between faculty of color who are from the U.S. vs. from another country (e.g., African-American vs. African), except where noted in Section 3.2, URG is defined simply as non-white and non-Asian because the ASEE data does not include information regarding foreign nationals.

### 3.1. Comparison to other universities

Because an important use of the data is to compare to national norms (as provided by ASEE), and since demographic data for non-tenure-track faculty is not available for universities across the country in the ASEE database, the data presented in this section is for tenure/tenure track (T/TT) faculty only. CT Faculty are not included. The data for UD are compared both to all institutions in the ASEE database, and to UD's comparator group of 25 schools established by UD's president (Appendix). The data are compared both at the college level, and by department. It should be noted that UD's comparator group was selected considering institutions as a whole. As such, at both a college and department level, the comparator group may not be the group of top engineering programs that would be selected if only the College of Engineering, or if only specific departments in the College of Engineering departments, was concerned. For college-level comparisons, for each school, we sum only the faculty in the 7 departments that we have in the UD COE.

Table 1 and Figure 3 summarize the T/TT ASEE faculty data on percentage of women faculty over time, both for UD and the comparison groups. They indicate that in terms of percentage of women faculty, the College is above the national and comparator group averages (18% at UD vs. 16% for all schools and for the comparator group), and as a college, is at the 73<sup>rd</sup> percentile nationally. Figure 3 shows that over the last 10 years, the percentage of women faculty has been increasing at all universities, and especially at UD. This is likely due in great part to the College's explicit efforts under the ADVANCE PAID grant (2008-2013) and the ADVANCE-IT grant (2014-present). Table 1 and Figure 3 also show that the distribution across universities is, and has been, relatively tight, with a difference of only about 6 to 8 percentage points between the 25<sup>th</sup> and 75<sup>th</sup> percentile.

Table 1. % Women faculty for the COE as a whole, for T/TT only, over 10 years (2007-2016)

	Year									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	Percentage female, all ranks									
University of Delaware	14%	14%	12%	15%	18%	17%	16%	17%	20%	18%
Average of all schools	12%	13%	13%	14%	14%	14%	14%	15%	15%	16%
Average of comparators	13%	13%	13%	14%	14%	15%	16%	15%	17%	16%
75th percentile among all schools	15%	15%	16%	17%	17%	17%	18%	19%	19%	19%
25th percentile among all schools	9%	9%	9%	9%	10%	9%	10%	10%	11%	12%
UD's percentile among all schools, in terms of %FF	73th	65th	48th	68th	76th	78th	67th	67th	81th	73th

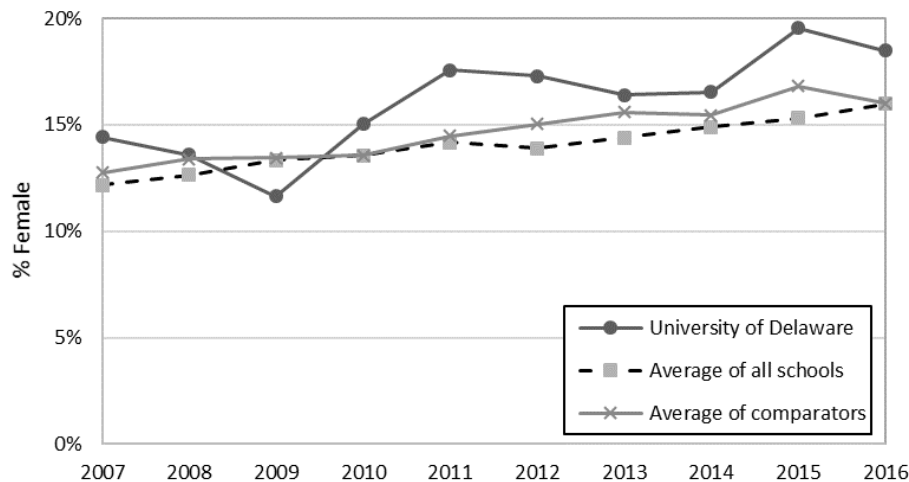


Figure 3. Percentage of women faculty in the College, 2007-2016

Table 2 and Figure 4 show the 2016 data by department, including in Table 2, the approximate number of faculty required to reach the 75<sup>th</sup> percentile, one possible target, assuming all else remains constant. BMEG and CISC have notably high percentages of women faculty (43% and 26%, respectively). In total, four departments are above the national average (BMEG, CIEG, CISC, and ELEG), while three are below the national average (CHEG, MEEG, MSEG) (Table 2). The differences are relatively small, however; in only one case is a department more than 2 percentage points below the average (CHEG is 5 percentage points below).

Another useful way of interpreting the data is to see how much of a change is required in each to reach the 75<sup>th</sup> percentile. Because the numbers of faculty in a department are relatively small (approximately 20, Table 2) and thus percentages are variable, and because the distribution across universities is relatively tight, it turns out that even departments in a relatively low percentile now, with only 1 to 2 additional women faculty, all departments would reach the 75<sup>th</sup> percentile (all else remaining constant) (Table 2). Of course, the flip side is that the loss of a just a few women faculty can cause a substantial drop, and thus retention is exceedingly important. It is also worth noting again that the President has proposed a plan to grow the College faculty substantially in the coming years. Once more details are available on that plan, the analysis can be repeated to determine how much of that growth would have to include women faculty to reach the targets from Section 2.

Table 2. % Female by department and for COE as a whole, for T/TT only, for 2016

	Department							
	BMEG	CHEG	CIEG	CISC	ELEG	MEEG	MSEG	COE
	Percentage female, all ranks							
University of Delaware	43%	14%	20%	26%	16%	10%	15%	18%
Average of all schools	24%	19%	18%	19%	13%	12%	17%	16%
Average of comparators	19%	17%	21%	17%	12%	14%	17%	16%
75th percentile among all schools	30%	25%	25%	24%	18%	17%	23%	19%
25th percentile among all schools	15%	11%	13%	12%	6%	5%	11%	12%
UD's percentile among all schools, in terms of %FF	91st	38th	51th	81th	69th	41th	49th	73th
Num. comparators	22	20	23	12	24	23	19	25
Total num. T/TT faculty at UD	7	21	20	19	19	20	13	119
Num. needed to get UD to 75th percentile	---	2.3	1.0	---	0.4	1.4	1.0	0.6

\* BMEG=Biomedical; CHEG=Chemical & Biomolecular; CIEG=Civil & Environmental; CISC=Computer & Information Sciences; ELEG=Electrical & Computer; MEEG=Mechanical; MSEG=Materials Science

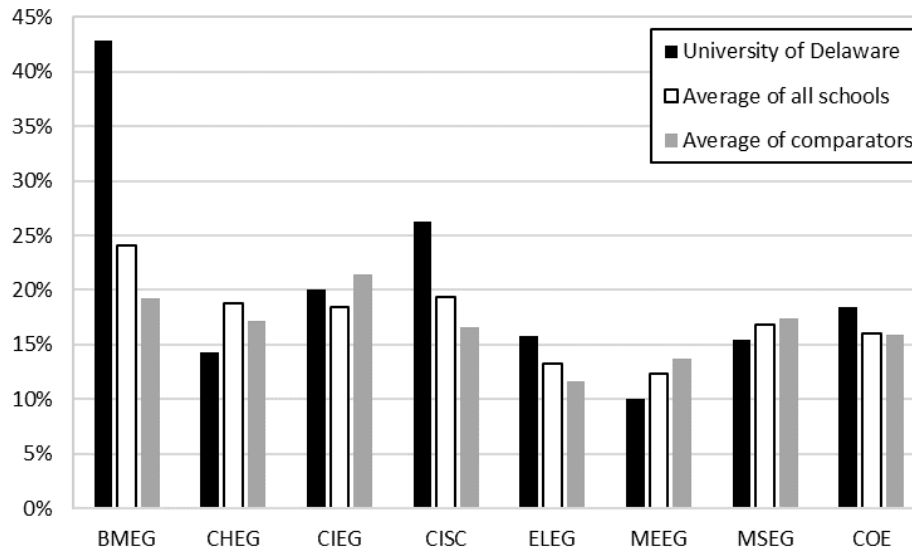


Figure 4. Percentage of women faculty by department and for the College as a whole (2016)

Tables 3 and 4 and Figures 5 and 6 provide analogous data for percentage of faculty from URGs. Table 3 and Figure 5 indicate that unlike for women faculty, the percentage of faculty from URGs has remained relatively constant over the last decade both for UD and for the comparator groups. The College has remained approximately at the national average. As of 2016, the College has 7% faculty from URGs and is at the 66<sup>th</sup> percentile nationally. The data show the distribution of percentage URG faculty across universities is also tight, with the difference between the 25<sup>th</sup> and 75<sup>th</sup> percentile only being 5 to 10 percentage points. Since the numbers of URG faculty are even smaller than women faculty (8 vs. 21 out of 119 in UD's college), the percentages are even more variable than for women faculty.

Table 4 and Figure 6, which present the URG faculty data by department, show that although two of the seven departments have zero faculty from URGs (BMEG and MEEG), the other departments are in the 64<sup>th</sup> to 84<sup>th</sup> percentile nationally. Examining the number of additional faculty from URGs required to meet the targets, Table 4 suggests that 0 to 2 are required in each department to reach the 75<sup>th</sup> percentile (all else remaining equal). As discussed in Section 3.2, the relative goal is much easier to meet in this case because most universities have very low percentages of URG faculty. Thus, we feel that it may be desirable to try to achieve a minimum critical mass as opposed to a percentile ranking. Again, while the plus side is that small changes can have a big effect, the downside is that the loss of only one faculty member from either group (women or URG) leads to a substantial drop in the percentage.

Table 3. % URG for the COE as a whole, for T/TT only, over 10 years (2007-2016)

	Year									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	Percentage URG, all ranks									
University of Delaware	7%	7%	8%	6%	5%	5%	6%	6%	9%	7%
Average of all schools	12%	13%	14%	7%	8%	8%	8%	7%	8%	7%
Average of comparators	7%	7%	7%	5%	6%	5%	5%	5%	5%	5%
75th percentile among all schools	12%	13%	13%	8%	8%	8%	8%	8%	8%	8%
25th percentile among all schools	3%	3%	3%	2%	2%	2%	2%	2%	2%	3%
UD's percentile among all schools, in terms of %URG	56th	55th	57th	64th	56th	56th	63th	57th	78th	66th

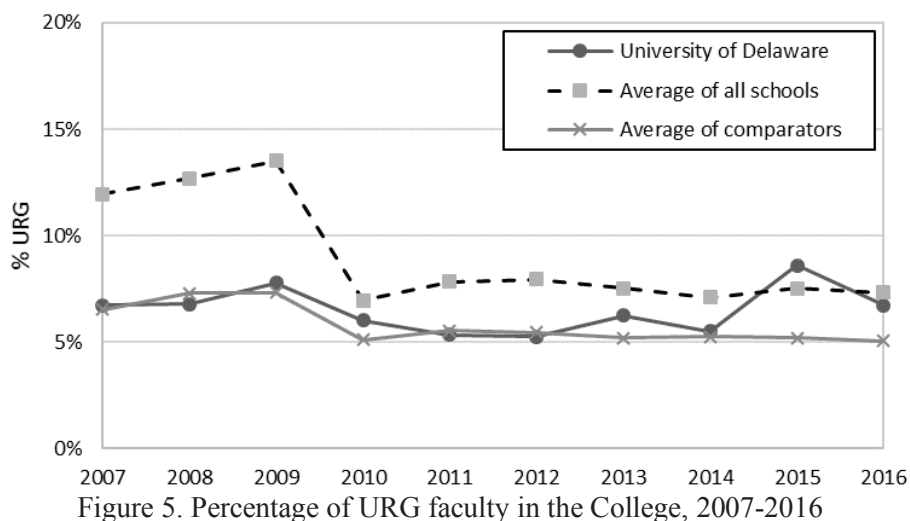


Table 4. % URG by department and for COE as a whole, for T/TT only, for 2016

	Department							
	BMEG	CHEG	CIEG	CISC	ELEG	MEEG	MSEG	COE
	Percentage URG, all ranks							
University of Delaware	0%	10%	10%	5%	11%	0%	8%	7%
Average of all schools	6%	10%	8%	6%	6%	7%	7%	7%
Average of comparators	6%	6%	5%	3%	5%	5%	5%	5%
75th percentile among all schools	9%	14%	12%	7%	7%	9%	9%	8%
25th percentile among all schools	0%	0%	0%	0%	0%	0%	0%	3%
UD's percentile among all schools, in terms of %URG	0th	64th	65th	66th	84th	0th	68th	66th
Num. comparators	22	20	23	12	24	23	19	25
Total num. T/TT faculty at UD	7	21	20	19	19	20	13	119
Num. needed to get UD to 75th percentile	0.6	1.0	0.5	0.3	---	1.8	0.2	1.4

\* BMEG=Biomedical; CHEG=Chemical & Biomolecular; CIEG=Civil & Environmental; CISC=Computer & Information Sciences; ELEG=Electrical & Computer; MEEG=Mechanical; MSEG=Materials Science



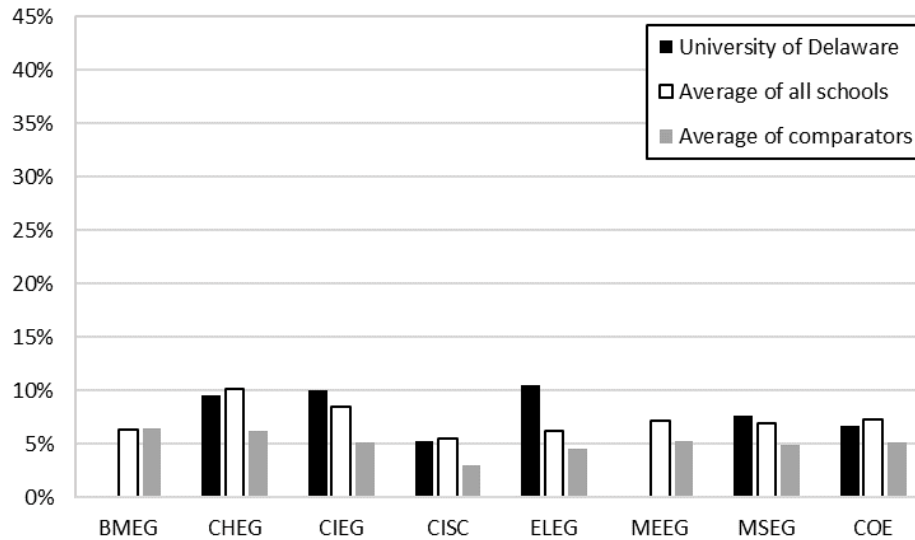


Figure 6. Percentage of URG faculty by department and for the College as a whole (2016)

### 3.2. UD data for June 2017

In this section we focus on data for the College of Engineering as of June 2017 so that we can examine a few issues that cannot be investigated using the ASEE data—faculty type (T/TT vs. CT), faculty rank, and URG faculty who are citizens vs. foreign nationals. A few notes about the data deserve mention. The data do not include non-COE faculty with secondary appointments in the College. Faculty are assigned a department based on their primary appointment. Faculty with administrative positions (e.g., Dean, Associate Dean) are included in the data for their home department. Appendix B includes the raw data analyzed in this section.

Figure 7 shows the percentage of female and percentage of URG faculty by type and rank. They indicate that while overall, the College has 22% women faculty and 7% URG faculty, the percentages vary by type and rank. In particular, women are better represented among CT faculty than T/TT faculty, and the proportion of T/TT women declines with rank. This is largely because the number of men increases substantially at the higher ranks. While there are 6, 9, 11, and 7 female CT, T/TT Assistant, T/TT Associate, and T/TT Full professors, respectively, there are 10, 18, 26, and 62 males in the same groups. For URG faculty, there are none in the CT group, and the percentages do not show a trend in terms of T/TT rank. On the one hand, CT faculty tend to do a lot of teaching, especially to younger students, so it is positive that they are particularly diverse with respect to gender. On the other hand, CT faculty and T/TT Assistant Professors tend to have less power within the College structure, so it can be problematic if too many of the women are concentrated in those groups and not the tenured ranks.

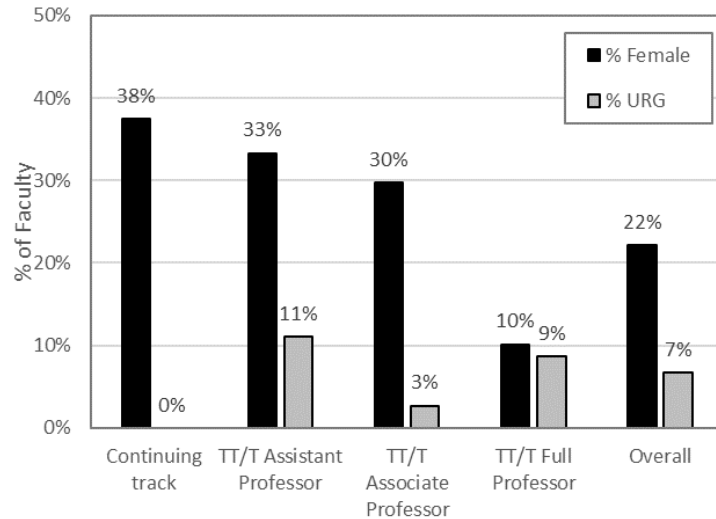


Figure 7. Percentage of faculty who are female and percentage of faculty who are URG by type (CT vs. T/TT) and rank, as of June 2017

To investigate the effect of type and rank more closely, we examine the breakdown by department. For each department and the College as a whole, Figure 8 indicates the percentage of faculty who are female among all faculty, tenured faculty only, and full professors only. Table 5 presents the associated data, together with the number of additional faculty needed to meet the 30% women faculty and 15% URG faculty targets (including both T/TT and CT). Figure 8 indicates some variability across departments with BMEG (which only has 11 faculty total) and CISC having high percentages of women faculty, 45% and 29%, respectively, and CHEG having a low percentage (15%). For all departments except BMEG and CISC, and to some extent CIEG, the percentage of women faculty declines with rank. Notably, CHEG, ELEG, and MEEG have no female full professors. Since tenured faculty and especially full professors tend to have more influence in department affairs, this is important to note. Figure 9 (and Table 5) shows the same information for faculty from URGs. In this case, CHEG has a relatively high percentage of URG faculty, while MEEG is the lowest, with zero URG faculty. Again, at the full professor level, BMEG, CISC, MEEG, and MSEG have no URG faculty at all (although note that BMEG has only one full professor (Table 5)).

To meet the targets of 30% women faculty and 15% faculty from URGs in all departments (including both T/TT and CT) would require an additional 0 to 4 women faculty and 1 to 4 faculty from URGs in each department, all else remaining constant (Table 5). Overall, the College would need to hire 12 additional women faculty and 12 additional faculty from URGs.

We recognize that there are both similarities and important distinctions between faculty of color who are from the U.S. vs. from another country (e.g., African-American vs. African). Although perfect information on this is not available (i.e., who grew up where), we did examine the breakdown of URG faculty (non-White, non-Asian) who are U.S. citizens vs. those who are not (permanent resident or N/A). Of the 10 URG faculty in the College, 6 are U.S. citizens.

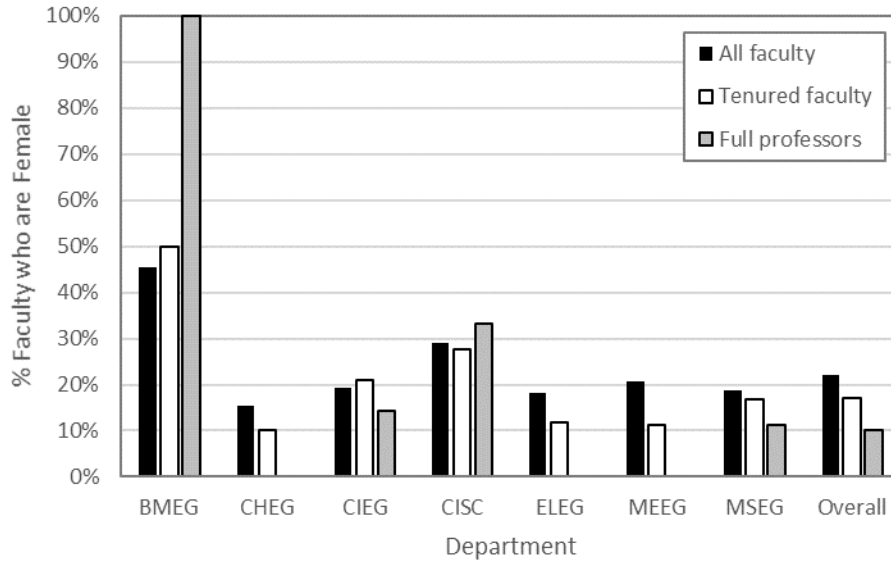


Figure 8. Percentage of faculty who are female among all faculty, tenured only, and full professors only, by department, as of June 2017  
 (Note: BMEG has only two tenured faculty and only one Full professor, Table 5)

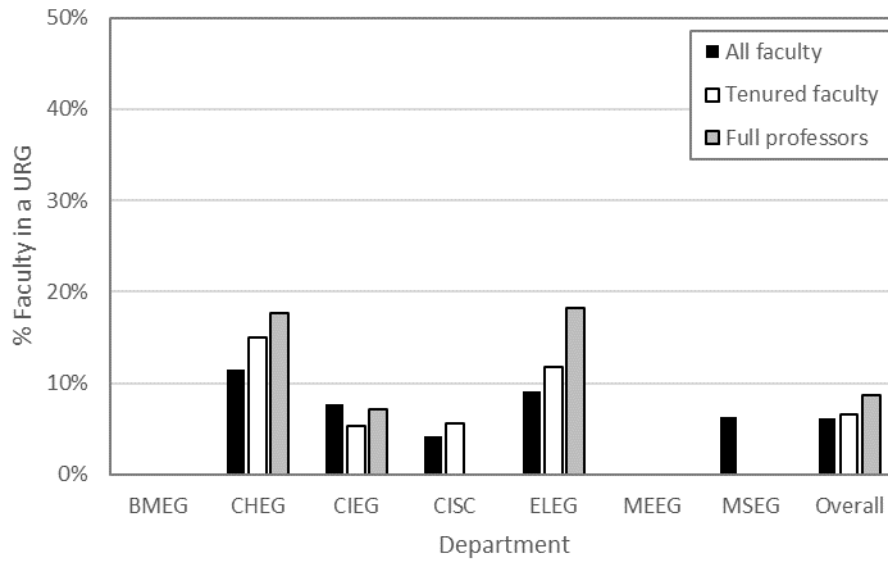


Figure 9. Percentage of faculty who are URG among all faculty, tenured only, and full professors only, by department, as of June 2017

Table 5. Percentage of faculty who are women/URG among all faculty, tenured only, and full professors only, by department, as of June 2017

Department	BMEG	CHEG	CIEG	CISC	ELEG	MEEG	MSEG	COE
All faculty								
Total num.	11	26	26	24	22	24	16	149
% Female	45%	15%	19%	29%	18%	21%	19%	22%
% URG	0%	12%	8%	4%	9%	0%	6%	7%
Num. FF needed to get UD to 30%	---	3.8	2.8	0.2	2.6	2.2	1.8	11.7
Num. URGs needed to UD to 15%	1.7	0.9	1.9	2.6	1.3	3.6	1.4	12.4
Tenured faculty only								
Total num.	2	20	19	18	17	18	12	106
% Female	50%	10%	21%	28%	12%	11%	17%	17%
% URG	0%	15%	5%	6%	12%	0%	0%	7%
Full professors only								
Total num.	1	17	14	9	11	8	9	69
% Female	100%	0%	14%	33%	0%	0%	11%	10%
% URG	0%	18%	7%	0%	18%	0%	0%	9%

\* BMEG=Biomedical; CHEG=Chemical & Biomolecular; CIEG=Civil & Environmental; CISC=Computer & Information Sciences; ELEG=Electrical & Computer; MEEG=Mechanical; MSEG=Materials Science

#### 4. Graduate student data

As in many American colleges of engineering, approximately half the graduate student population is international. At UD, they are predominantly Asian. As a result, graduate students are quite diverse in terms of country of origin. However, since Asians are not underrepresented in engineering, most international graduate students are not considered to be from an underrepresented group. Unfortunately, available data do not disaggregate international students, and as a result, we cannot determine how many international students are from URGs. Therefore, although it would be of interest to know the percentage of students from URGs among all graduate students, it is only possible at this time to analyze and track the percentage of domestic students from URGs and thus the plan discusses the goals and current status in these terms.

Women and URGs have historically been poorly represented in science, technology, engineering and mathematics (STEM) fields. At UD in 2016, 92 PhD students graduated from the College of Engineering (42 domestic; 50 international), and 139 MS degrees were awarded (63 domestic; 76 international). Of the PhD students, 22 were women (24% of all PhD students) and 8 were members of underrepresented groups (19% of domestic PhD students). Among the students who earned MS degrees, 36 were women (26% of all MS students) and 13 were members of URGs (21% of domestic students).

The percentage of women students in each engineering department at UD is close to or above the average percentage of women students in engineering programs nationwide as well as in engineering programs at the “comparator” universities defined by President Assanis (Appendix A) (Figure 10). In fact, Materials Science and Engineering is already above the 33% threshold (35%), and the departments of Civil and Environmental Engineering and Chemical and Biomolecular Engineering are very close (32% and 30%, respectively). These departments should focus on ensuring that these students are supported throughout their graduate careers. The other departments range from 18% (Electrical and Computer Engineering and Mechanical Engineering) to 27% (Computer and Information Sciences). Because the total number of PhD students entering each department is less than 25 per year, and the total number of MS students is generally 50 or less, small changes (less than 5 per department, with the exception of ELEG, see Aim 1

and Tables 1 and 2 in Section III) in the number of women or URG students enrolling and graduating will suffice to meet the targets. We thus believe that the proposed goals for women graduate students can be achieved within 5 years in every department.

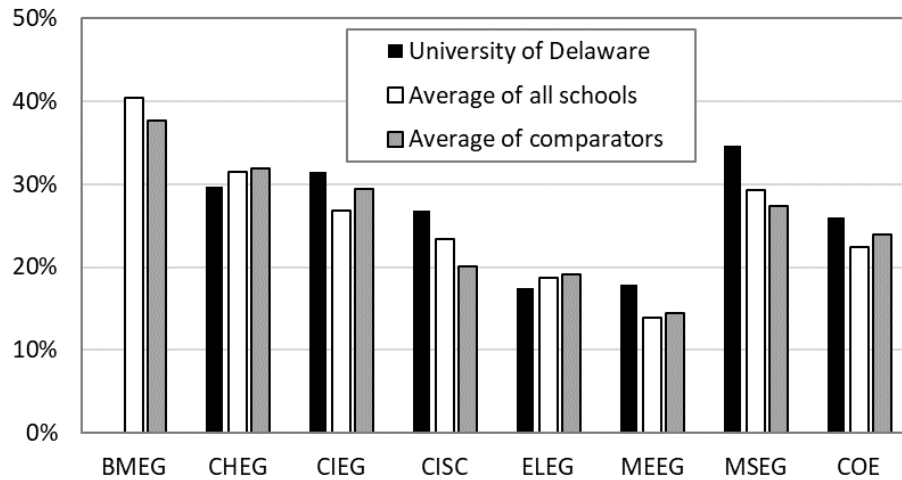


Figure 10. Percentage of all graduate students who are women, averaged over five years 2012-2016, by department and for the College as a whole. Data is from the Engineering Data Management System Database maintained by ASEE (edms.asee.org). Note UD’s BMEG department is new, so it is omitted.)

The number of students from URGs in the College of Engineering is much lower than the total number of women, and UD has lower percentages of domestic students from URGs in every department when compared both to engineering programs nationwide and to a subset of “comparator” universities (Fig. 11). The percentage of domestic students who are members of URGs ranges from 9% to 16% in departments in the College of Engineering. Although these percentages are much lower than those at similar universities, because the numbers are small, the 25% goal within 5 years is reasonable: again, departments need to recruit 3 or fewer additional domestic students from URGs per year to reach this goal (less than 5 per department). Support for these students during their graduate careers will be especially important to ensure successful graduation for matriculated students.

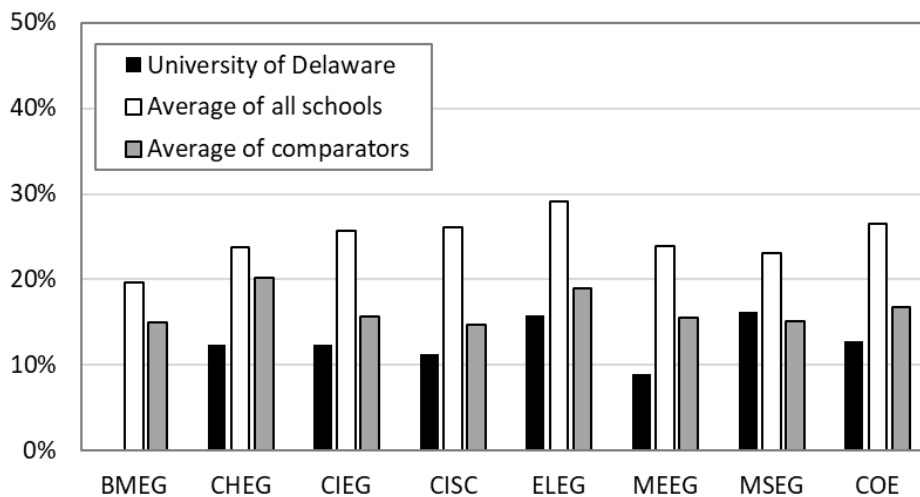


Figure 11. Percentage of all domestic students who are from URGs, averaged over five years 2012-2016, by department and for the College as a whole. Data is from the Engineering Data Management System Database maintained by ASEE (edms.asee.org). Note UD’s BMEG department is new, so it is omitted.)

Retention rates cannot currently be tracked by the College of Engineering Academic Analysis staff. However, it is possible to obtain this data from the Registrar’s Office. As an example, in the class of students who matriculated in the Civil and Environmental Engineering department in 2010, 13/15 incoming MEng students graduated, and 13/16 incoming PhD students graduated. Both of the MEng students who left without degrees were international students (one male, one female), while 2 of the 3 PhD students who left were white men and the third was another international student.

## 5. Undergraduate student data

### 5.1. Demographics

We reviewed and analyzed institutional data and reports from the literature to determine current and target undergraduate demographics for the College. Annual aggregate data was procured from UD Institutional Research for graduation class size of each engineering undergraduate major for the years 2011-2015. Graduation included spring and winter graduation for a given year. Data were obtained for overall class size as well as the numbers of women and URG graduates. Percentage women and URGs were calculated per year, and descriptive statistics (mean and st.dev) were computed across all years and reported as the primary outcomes, %Women and %URG.

To benchmark the College’s performance, %Women and %URG for each undergraduate program was compared to all other ABET-accredited programs nationally. Current data from other programs were obtained from the American Society for Engineering Education (ASEE) Engineering Data Management System, and reported %Women and %URG values from this database were fit to normal distributions for each major discipline. UD’s ranking as a percentile on the normal distribution was then determined, with higher percentiles indicating more representation of minority groups. Results are presented in Table 6.

Table 6. Demographics for all UD engineering programs, with %Women and %URG representing mean diversity percentages in graduating class for 2011-2015.

Major	Class size	%Women	%URG	Percentile Nationally	
				%Women	%URG
Biomedical engineering	49	43.3%	5.7%	57 <sup>th</sup>	48 <sup>th</sup>
Chemical engineering	57	28.8%	4.3%	32 <sup>nd</sup>	30 <sup>th</sup>
Civil engineering	58	20.9%	4.9%	9 <sup>th</sup>	44 <sup>th</sup>
Computer science	63	7.0%	5.9%	18 <sup>th</sup>	32 <sup>nd</sup>
Computer engineering	28	9.8%	6.2%	45 <sup>th</sup>	43 <sup>rd</sup>
Electrical engineering	46	11.9%	6.0%	46 <sup>th</sup>	37 <sup>th</sup>
Environmental engineering	19	41.9%	11.5%	23 <sup>rd</sup>	34 <sup>th</sup>
Mechanical engineering	92	17.2%	6.0%	74 <sup>th</sup>	38 <sup>th</sup>

Note: “Percentile Nationally” refers to a particular UD department’s ranking for %Women and %URG versus all other ABET-accredited programs in the US. Higher percentiles represent more diversity.

Gender distribution by discipline strongly aligns with national trends, with biomedical, chemical, and environmental engineering exceeding 30% women; and computer science, computer engineering, and electrical engineering at less than 15% women. UD Biomedical, Chemical, and Environmental Engineering have achieved critical mass for women (30%). Relative to other universities nationally, the UD Mechanical Engineering program stands out in terms of gender diversity, ranking at the 74<sup>th</sup> percentile nationally, with Biomedical, Computer, and Electrical Engineering near or slightly above the national mean (50<sup>th</sup> percentile).

In terms of racial diversity, URGs are consistently under-represented within each discipline in the College, ranging from approximately 4% to 12% across programs. All of our programs fall far short of the top quartile nationally, ranging from 30<sup>th</sup> (Chemical Engineering) to 48<sup>th</sup> (Biomedical) percentile nationally; and they are also far below our “sufficient mass” target of 15% URG.

## 5.2. Retention

We reviewed and analyzed institutional data and reports from the literature to determine current and target undergraduate retention rates for the overall population as well as women and under-represented groups (URGs). Four and six-year graduation rates were procured from Institutional Reports on the Blue Hen Success Collaborative (BHSC) software system. These data were taken directly from BHSC, which reported aggregated results for students who enrolled between and including the Fall 2006 to 2012 Spring Semesters (these are the most current data available). Data were reported for the entire graduating cohort and separately for women and URG graduates. Due to limitations in the BHSC software, URG was not directly measurable as a subpopulation, so it was calculated as the population size-weighted average of the Black, Hispanic, and Multi-Ethnicity populations. Due to similar software limitations, graduation rates for the white male majority population were reported as the white population as a whole. Lastly, data on student retention for the Biomedical Engineering Program only reflects 2-3 graduation cohorts because it was founded during the 2006-2012 period. Results are shown in Table 7 and Figure 12.

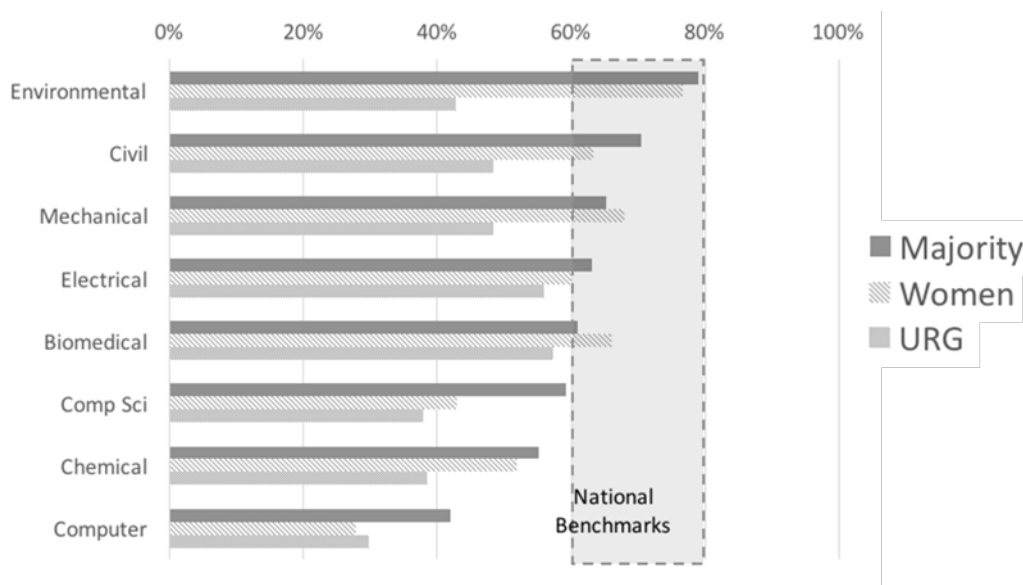


Figure 12. 6-year graduation rates in UD College of Engineering majors for majority population, women, and URGs. Data from Table 2. National benchmarks (60-80% 5-year graduation) presented for reference.

Table 7. Retention rates, quantified by 6-year graduation rates, for all undergraduate majors in the College, for both majority and minority populations.

Major	6-Year Graduation Rate		
	Majority	Women	URG
Biomedical engineering	61.0%	66.0%	57.2%
Chemical engineering	55.2%	51.8%	38.5%
Civil engineering	70.5%	63.2%	48.4%
Computer science*	59.3%	42.9%	37.9%
Computer engineering	41.9%	27.8%	29.7%

Electrical engineering	63.0%	60.0%	55.9%
Environmental engineering**	79.0%	76.7%	42.8%
Mechanical engineering	65.3%	68.0%	48.3%

\* Retention rates reported for BS degree, not BA.

\*\* Environmental Engineering B-EN degree designations are further subdivided within the BHSC system. Results are reported only for the Water Resources and Water Quality sub-degree.

For benchmarking purposes, national data for retention rates in engineering programs was taken from a comprehensive report from the American Society for Engineering Education (2012, Going the Distance). This report suggested that national averages for 6-year graduation rates were approximately 60% for the majority population (white males), 61% for females, and 38-44% for URGs. Programs that are achieving excellence in student retention reach 6-year graduation rates of 75-80% for their entire student body and 60-70% for URGs.

Retention rates across the College are for the most part in line with national averages; however, our performance is not exceptional (Figure 12). 6-year graduation rates for majority students met or exceeded the national average of 60% for all departments except Chemical Engineering (55.2%) and Computer Engineering (41.9%). Computer Science and Computer Engineering showed a 15%-point deficiency for women versus the majority population. With the exception of Biomedical and Electrical Engineering, all departments demonstrated a 20%-point gap between URGs and the majority population, which unfortunately is in-line with national average (38% URG retention). Computer Engineering was an outlier in this regard, with URG retention that was 10% lower than the national average.

There were some interesting patterns in 4 versus 6-year graduation rates across different groups. All majors saw gains in graduation rates from 4 to 6 years, suggesting that some students may take longer, potentially alternative routes through the curriculum. Increases in graduation rates for women tended to be similar to the majority population, indicating that men and women as a whole follow the same pathways through our programs. URG populations tended to demonstrate more substantial gains in 4 to 6-year graduation rates than their majority peers for Computer Science, Electrical Engineering, and Mechanical Engineering. This suggests that URGs are persisting in these majors by taking extra time to complete their coursework. Women in Computer and Electrical Engineering behave similarly to URGs in this regard and may also be taking “alternative routes” at higher frequencies than the majority students.

Given the small numbers of women and URGs within each discipline, only relatively modest changes to our recruitment and retention practices are necessary to achieve our diversity goals. For instance, our electrical engineering program, currently in the 46<sup>th</sup> percentile nationally, could boost their ranking into the top quartile by enrolling 3 additional women annually and increasing retention for all students from 60% to 70%. For URGs, similarly modest shifts in enrollment and retention are needed in order to achieve sufficient mass (15% URG) or top-quartile national performance. This can only be achieved, however, if the college first prioritizes eliminating the near 20%-point disparity in retention between URGs and the majority population (see Table 7). Given equivalent 6-year graduation rates, each discipline need only recruit 2-8 additional URGs in order to achieve sufficient mass or top-quartile performance nationally.

## 6. Staff data

A few notes about definitions are important before presenting staff demographic data. First, faculty who serve as administrators (e.g., Dean, Associate Deans, Department Chairs) are not included in this plan, although they are often considered staff for some accounting purposes. In this context, they are considered to be faculty first, and thus are included in the faculty diversity plan. Second, in this plan, we



consider staff based on their job type (administrative support, technical support, and research) and level (managerial or non-managerial) (Table 8). We include research staff in the analysis, but do not address them directly in the specific aims and action items because the way they are recruited by Principal Investigators (faculty) and their job descriptions make them more similar to faculty or graduate students than other support staff. Managerial positions are assumed to include those for which the title includes the word *manager*, *director*, *supervisor*, *business administrator* or *business officer*. Distinguishing managerial versus non-managerial is a way to examine any possible discrepancies in staff rank and, hence, compensation.

Table 8. Jobs included in each type

<b>Job type</b>	<b>Jobs included</b>
Administrative support	Human resources staff, department support staff (administrative assistants, academic advisors, business administrators), sponsored research and procurement staff, outreach, Dean’s support staff, financial services, academic affairs, communications
Technical support	Facilities, lab coordinators, core facilities (machine shops, electronics), information technology
Research staff	Lab and center researchers (Engineers), post-doctoral researchers, limited-term researchers

Using the definitions presented and data from 2017, we analyzed the current demographic breakdown by staff type (administrative support, technical support, and research) and level (managerial or not). Appendix B includes the data on which the analysis is based. Specifically, we examine gender and membership in underrepresented groups (URGs, defined as non-White, non-Asian). Consistent with the University’s Inclusive Excellence Diversity Action Plan, we seek diversity in all dimensions (e.g., age, race, gender identity). Nevertheless, we focus here on gender and URGs, same as the faculty and student plans, since they are two of the most obvious potential sources in our lack of diversity. We also fully expect that many actions taken will support diversity and inclusiveness more generally since they are primarily meant to implement best practices for hiring, retention, and climate improvement. Since the College currently recruits most administrative and technical support staff from the New Castle County population, we use that as a comparison group.

Of the 150 College staff, 94, 35, and 21 are administrative support, technical support, and research, respectively. Figure 13 shows the 2017 gender and URG data for College administrative support staff, technical support staff, research staff, and for the New Castle County population. It highlights a stark gender divide among staff. Administrative support staff are overwhelmingly female (87%), while technical support and research staff are overwhelmingly male (80% and 81%). It also shows low numbers of staff from URGs—13% of administrative, 9% of technical, and 0% of research staff are from URGs, compared to 35% in New Castle County.

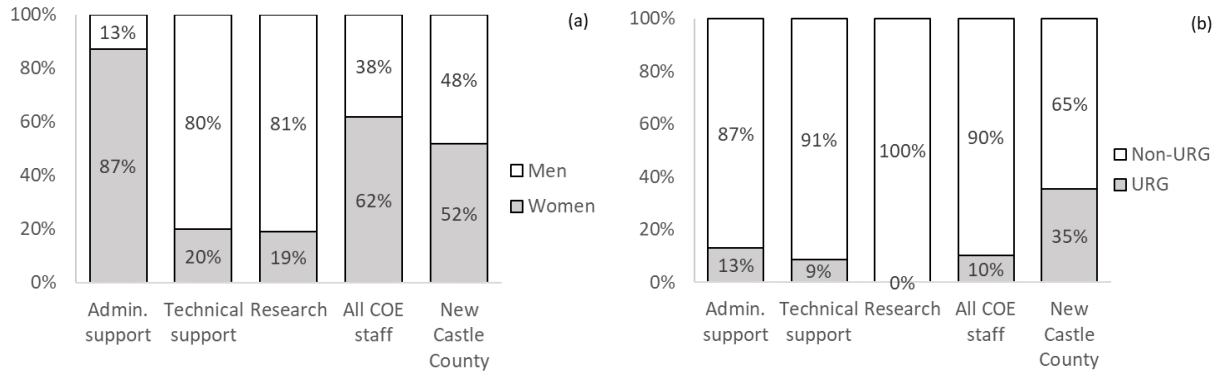


Figure 13. UD COE administrative support staff, technical support staff, research staff, and New Castle County population, (a) by gender and (b) by underrepresented group (URG) and non-URG

Focusing on the administrative and technical support staff, Figure 14 presents the 2017 gender and URG data for the College managerial and non-managerial staff. Although men make up only 31% of the administrative and technical support staff (40 of 129, Appendix), they hold more than half (55%) of the managerial positions. Women do hold close to half the managerial positions (45%), but given that there are more women in general, that represents a disproportionately low percentage of managerial positions. Staff from URGs hold an equally small percentage of managerial and non-managerial positions (10% and 12%) though they account for 35% of the New Castle County population.

Together these data suggest that the College staff could benefit from increased percentage of women in technical support and managerial roles, and an increased percentage of staff from URGs in all roles.

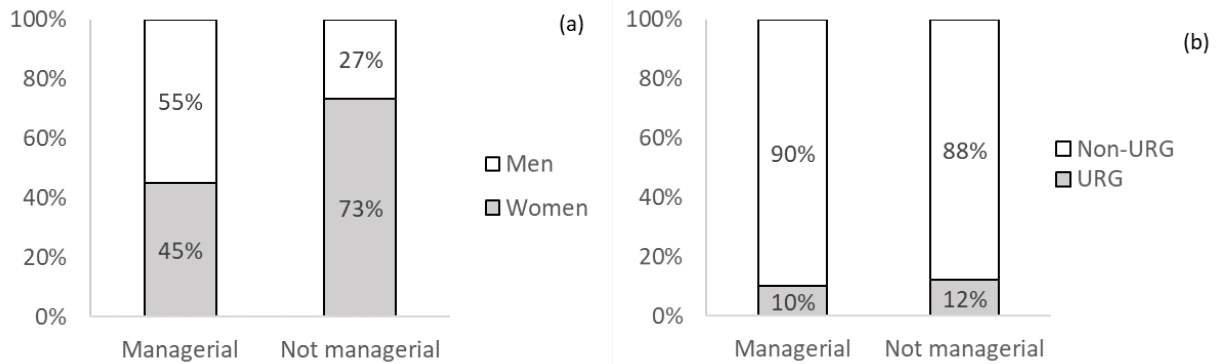


Figure 14. UD COE managerial staff and non-managerial staff, (a) by gender and (b) by underrepresented group (URG) and non-URG. (Does not include research staff.)

**Appendix A: University of Delaware Comparator Institutions (as of September 2016)**

1. Boston University
2. Case Western Reserve University
3. Georgia Institute of Technology – Main Campus
4. Indiana University – Bloomington
5. Iowa State University
6. Michigan State University
7. North Carolina State University at Raleigh
8. Ohio State University – Main Campus
9. Pennsylvania State University – Main Campus
10. Purdue University – Main Campus
11. Rutgers University – New Brunswick
12. Stony Brook University
13. Texas A&M University – College Station
14. University of Arizona
15. University of Connecticut
16. University of Illinois at Urbana-Champaign
17. University of Maryland – College Park
18. University of Massachusetts – Amherst
19. University of Michigan – Ann Arbor
20. University of Minnesota – Twin Cities
21. University of North Carolina at Chapel Hill
22. University of Pittsburgh
23. University of Utah
24. University of Virginia – Main Campus
25. Virginia Polytechnic Institute and State Univ

## APPENDIX B: Raw data for faculty and staff analyses

Table B1. Faculty by department, type/rank, and gender

Department	Continuing track		TT/T Assistant Professor		TT/T Associate Professor		TT/T Full Professor		Total		
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
BMEG Biomedical Engrg.	0	2	5	2	1	0	0	1	6	5	11
CHEG Chemical & Biomolecular Engrg.	1	1	3	1	1	2	17	0	22	4	26
CIEG Civil & Environmental Engrg.	4	0	2	1	3	2	12	2	21	5	26
CISC Computer & Info Sciences	2	0	2	2	7	2	6	3	17	7	24
ELEG Electrical and Computer Engrg.	2	0	1	2	4	2	11	0	18	4	22
MEEG Mechanical Engrg.	0	3	3	0	8	2	8	0	19	5	24
MSEG Materials Science & Engrg.	1	0	2	1	2	1	8	1	13	3	16
<b>Total</b>	<b>10</b>	<b>6</b>	<b>18</b>	<b>9</b>	<b>26</b>	<b>11</b>	<b>62</b>	<b>7</b>	<b>116</b>	<b>33</b>	<b>149</b>

\* Based on faculty with primary appointments with COE as of 6/6/17

\* Includes all faculty who are administrators (e.g., Dean, Deputy Dean, Assoc. Deans, Chairs) in their home departments. Does not include

\* Does not include non-COE faculty with secondary appointments with COE, Non-Tenure Temporary Faculty (e.g., Research Faculty), or faculty on non-paid leave of absence.

Table B2. Faculty by department, type/rank, and race

Department	Continuing track				TT/T Assistant Professor				TT/T Associate Professor				TT/T Full Professor				Total				
	White	Asian	URG-Non-U.S. citizen	URG-U.S. citizen	White	Asian	URG-Non-U.S. citizen	URG-U.S. citizen	White	Asian	URG-Non-U.S. citizen	URG-U.S. citizen	White	Asian	URG-Non-U.S. citizen	URG-U.S. citizen	White	Asian	URG-Non-U.S. citizen	URG-U.S. citizen	Total
BMEG Biomedical Engrg.	2	0	0	0	6	0	1	0	1	0	0	0	1	0	0	0	10	0	1	0	11
CHEG Chemical & Biomolecular Engrg.	1	1	0	0	2	2	0	0	1	2	0	0	10	4	0	3	14	9	0	3	26
CIEG Civil & Environmental Engrg.	4	0	0	0	2	0	1	0	3	2	0	0	9	4	1	0	18	6	2	0	26
CISC Computer & Info Sciences	2	0	0	0	2	2	0	0	7	1	0	1	4	5	0	0	15	8	0	1	24
ELEG Electrical and Computer Engrg.	2	0	0	0	0	3	0	0	3	3	0	0	6	3	0	2	11	9	0	2	22
MEEG Mechanical Engrg.	3	0	0	0	1	2	0	0	8	2	0	0	3	5	0	0	15	9	0	0	24
MSEG Materials Science & Engrg.	0	1	0	0	2	0	1	0	2	1	0	0	8	1	0	0	12	3	1	0	16
<b>Total</b>	<b>14</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>9</b>	<b>3</b>	<b>0</b>	<b>25</b>	<b>11</b>	<b>0</b>	<b>1</b>	<b>41</b>	<b>22</b>	<b>1</b>	<b>5</b>	<b>95</b>	<b>44</b>	<b>4</b>	<b>6</b>	<b>149</b>

\* Based on faculty with primary appointments with COE as of 6/6/17

\* Includes all faculty who are administrators (e.g., Dean, Deputy Dean, Assoc. Deans, Chairs) in their home departments. Does not include

\* Does not include non-COE faculty with secondary appointments with COE, Non-Tenure Temporary Faculty (e.g., Research Faculty), or faculty on non-paid leave of absence.

Table B3. College of Engineering staff data by job type, gender, and race

		Asian	Black/ African American	Hispanic/ Latino	N/A	Not Specified	White	Grand Total
Admin. support	Total	6	12		1	1	74	94
	Female	5	10		1	1	65	82
	Male	1	2				9	12
Tech. support	Total	3	2	1			29	35
	Female						7	7
	Male	3	2	1			22	28
Research	Total	11					10	21
	Female	4						4
	Male	7					10	17
Grand Total		20	14	1	1	1	113	150

Table B4. College of Engineering administrative and technical support staff data by job type, gender, and race (Does not include research staff.)

		Asian	Black/ African American	Hispanic/ Latino	N/A	Not Specified	White	Grand Total
Managerial	Total	3	2				15	20
	Female	1	1				7	9
	Male	2	1				8	11
Not managerial	Total	6	12	1	1	1	88	109
	Female	4	9		1	1	65	80
	Male	2	3	1			23	29
Grand Total		9	14	1	1	1	103	129