UNIVERSITY OF MICHIGAN TENURE TRACK FACULTY
AY2014 INDICATOR REPORT

Prepared by

UM ADVANCE Program

September, 2014

INTRODUCTION

The National Science Foundation (NSF) undertook the ADVANCE Institutional Transformation Program in 2001 as a way to cultivate the success of women in academic science and engineering who "continue to be significantly underrepresented in some science and engineering fields and proportionately under-advanced in science and engineering in the Nation's colleges and universities." The University of Michigan's ADVANCE Program was in the first cohort of institutions funded under this initiative. When that grant ended the University continued to fully fund the program and expanded it to address necessary institutional changes to support the needs of a diverse faculty in all fields.

The University of Michigan ADVANCE Program aims to improve our campus environment for faculty in four general areas: recruitment, retention, leadership and climate. The ADVANCE Program assesses the campus climate through a series of campus-wide faculty surveys (reports from those surveys can be found on the ADVANCE website) as well as individualized assessments of schools and department. The program also collects and reports annual indicator data about the state of the faculty at UM. These data are used to assess our progress in the areas of recruitment, retention and leadership.

This report examines the annual indicator data the UM ADVANCE Program has been accumulating since it began in AY2002. When the project began, NSF required that each institution funded under the ADVANCE Program report annually on these indicators (see Appendix A)[1] for STEM faculty at their individual institutions and compare each current reporting year with the baseline (AY2001) data as a way to assess change over time[2]. When the NSF funding ended at the end of AY2007 the ADVANCE Program continued the practice of collecting and reporting on these indicators annually, comparing the current year with the baseline. Over time several of the indicators were refined, those that were less informative and especially time consuming to collect were discontinued and others were added. In addition, as the mission of the ADVANCE Program broadened our data collection efforts broadened; not only did we begin collecting institutional data on all UM faculty, we worked to retroactively gather the same data for all non-STEM faculty not originally considered when the focus of the project was limited to STEM faculty. Much of this work has been completed, but some is still on-going.

As a result of these efforts the ADVANCE Program has amassed a large amount of demographic and descriptive data on the faculty of the University of Michigan across many years. Given this wealth of information we have initiated a process to more thoroughly consider these data, specifically in terms of ADVANCE's mission to improve efforts at recruitment, retention and leadership, to help University policy-makers at the University and individual school levels identify areas of success as well as needs for future and/or continued efforts.

We begin with this report to describe the faculty composition. Subsequent reports will consider hiring, retention, and faculty leadership and recognition. As noted above, the original focus of the program was

[1] There were 12 indicators identified by NSF.
[2] The ADVANCE Program is grateful to the data liaisons in each of the academic units for their invaluable assistance over time with the data collection and verification process.

STEM faculty, and only later was the mission broadened to include faculty campus-wide. Thus, this report examines the overtime faculty composition campus-wide as well as specifically for STEM faculty (defined here as faculty in the College of Engineering, the Medical School and the Natural Sciences Division of the College of Literature, Science and the Arts). When possible, data were examined separately for six groups of faculty: white men, Asian/Asian-American men, underrepresented minority (URM) men, white women, Asian/Asian-American women, and URM women to understand how the situation may vary for these different groups of faculty. However, occasionally the number of faculty was too small (especially in the case of faculty of color) to allow for such refinement.

ANNUAL FACULTY COMPOSITION

We first consider the percentage of all tenure track faculty by the six gender/race-ethnicity groups for all years for which we have data (AY1979 through the most recent academic year, AY2014). Data are presented for each year (rather than comparing the most recent year's data to the baseline data as was done previously) allowing a clear pattern of change in faculty composition over time to emerge; see Figure 1a. Most noticeable are the overtime decline in the percentage of white male faculty and the corollary increase in the percentage of white women. It appears that the percentage of women increased gradually over a 15 year time span. However, closer examination reveals a slight inflection in AY1996-97. A second slight inflection occurs between AY2004 and AY2005.

The percentages for faculty of color (both male and female) are small across the fifteen years. Nevertheless, we notice a slight increase beginning in the early nineties (but perhaps later for Asian/Asian-American women). Rates continued to increase over time for male Asian/Asian-American faculty, but remained fairly static for female Asian/Asian-American and female and male URM faculty after the period of slight increase.

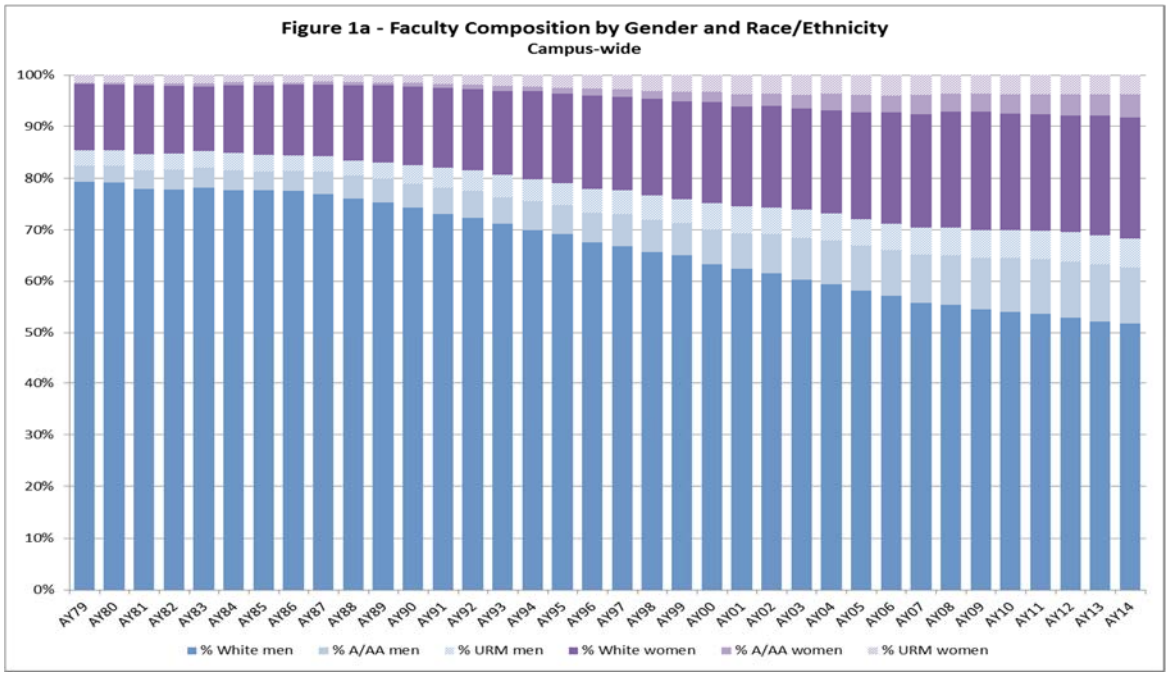
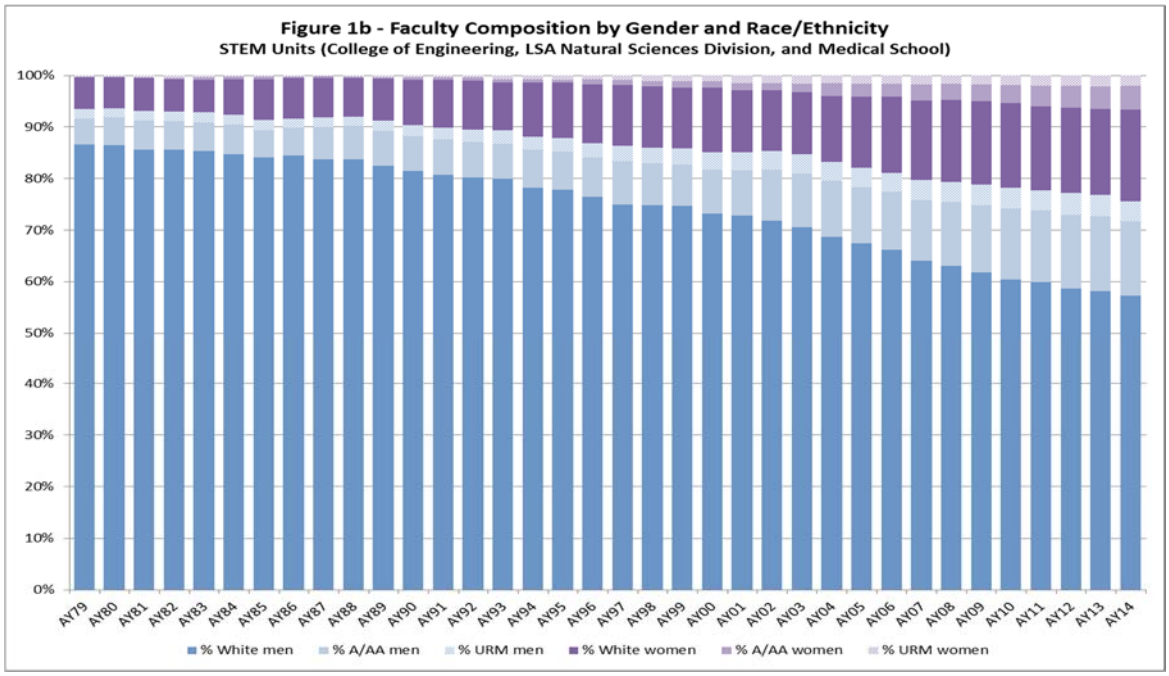


Figure 1b documents the same percentage of tenure track faculty groups for STEM faculty in Engineering, LSA and Medicine. The pattern here is similar to that for faculty campus wide (including a modest increase in the rate of women and faculty of color in the mid to late 90s). However, we note an even more noticeable change during the ADVANCE years, especially the increased percentage of white women (and Asian/Asian American men). In contrast, rates of underrepresented men and women faculty and Asian/Asian American women faculty were fairly constant during this period.



OVER TIME CHANGE in FACULTY COMPOSITION by TENURE STATUS

Another way to examine faculty composition is to look at change over time by tenure status. This was particularly relevant to NSF's focus, in creating the ADVANCE program, on the lack of women at the most senior faculty levels in STEM fields, despite extensive effort—and success—at lower stages of the academic "pipeline." Figures 2a and 2b show the over-time change in faculty makeup by gender University-wide separately for two cohorts of faculty during the ADVANCE years: those who were faculty during the period AY2003 to AY2008 and those who were faculty during the period AY2009 to AY2014. Figures 3a and 3b provide the same information for STEM faculty. These figures are useful for understanding where the change is happening (e.g., hiring, promotion). Most noticeable is that men are retiring at a much higher rate than women, which accounts for some closing of the gap between men and women. The rates of hiring and promotion were quite stable by gender across the two time periods campus-wide; in the case of STEM faculty, women were hired and promoted at a slightly higher rate in the latter time period.

Figures 4a and 4b and 5a and 5b depict over time change in faculty makeup by race-ethnicity for the same two time periods and, similarly, depict the higher rate at which white faculty are retiring. The rate of hiring was quite stable by race-ethnicity groups across the two time periods campus-wide and specifically for STEM faculty. Promotion rates increased slightly for Asian/Asian-American faculty and decreased for URM faculty campus-wide; in contrast, within STEM, rates decreased slightly for Asian/Asian-American faculty and increased slightly for URM faculty.

Figure 2a - UM Faculty (Campus-wide) - Change in Number of Tenure Track Faculty by Tenure Status and Gender, AY02-AY03 to AY07-AY08

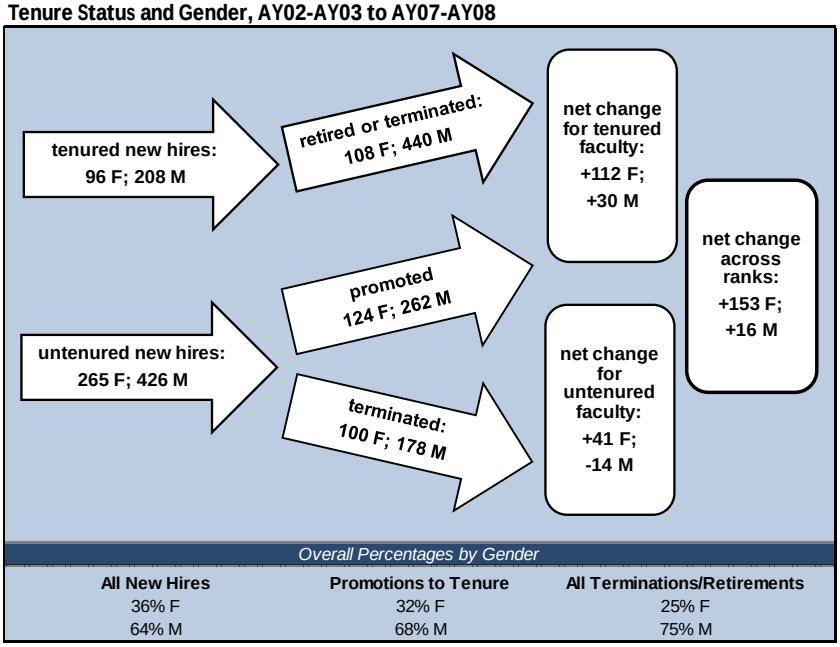


Figure 2b - UM Faculty (Campus-wide) - Change in Number of Tenure Track Faculty by Tenure Status and Gender, AY08-AY09 to AY13-AY14

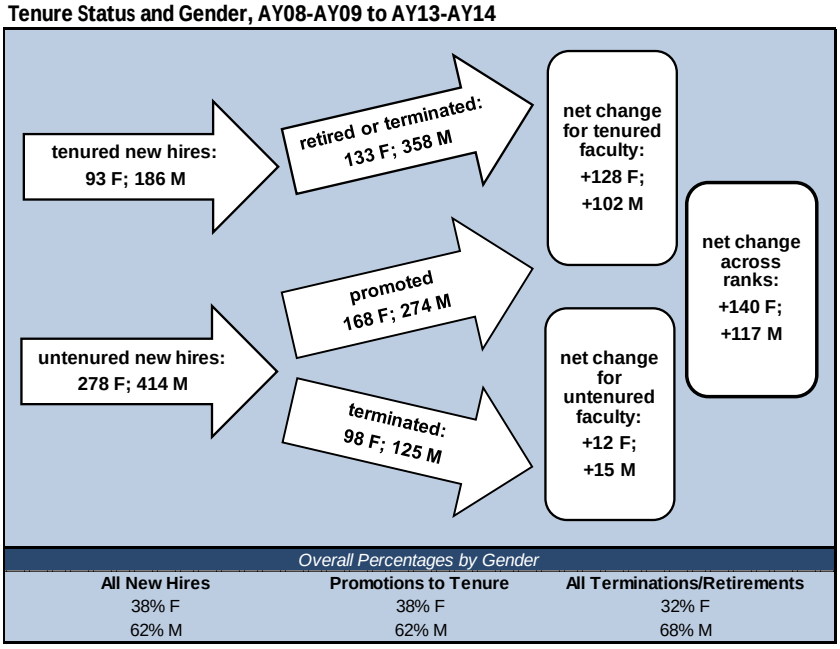


Figure 3a - UM Faculty (STEM) - Change in Number of Tenure Track Faculty by Tenure Status and Gender, AY02-AY03 to AY07-AY08

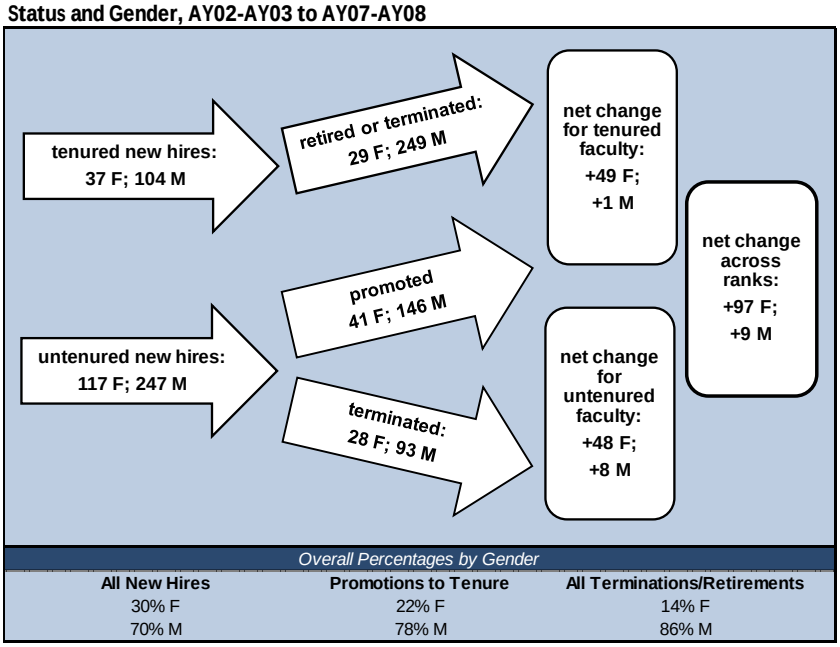


Figure 3b - UM Faculty (STEM) - Change in Number of Tenure Track Faculty by Tenure Status and Gender, AY08-AY09 to AY13-AY14

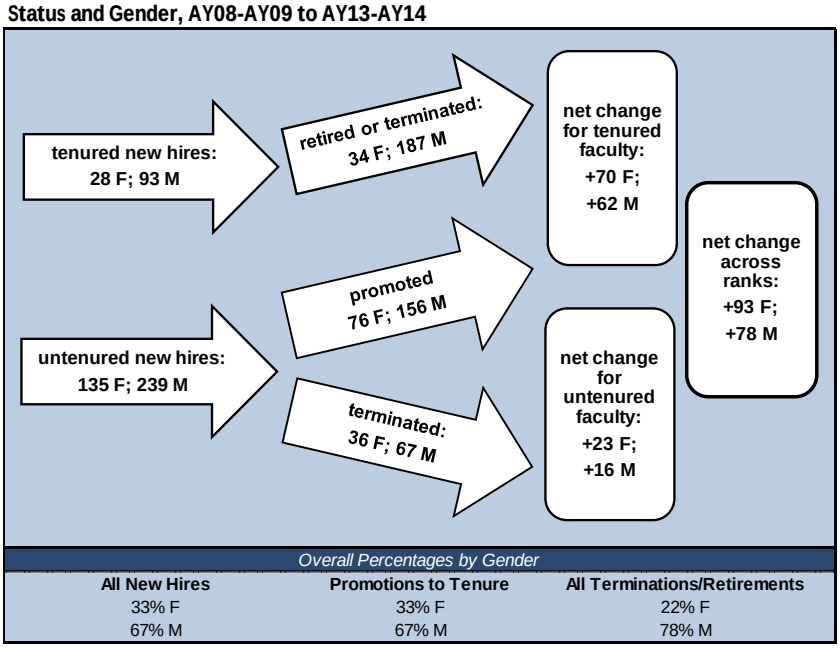
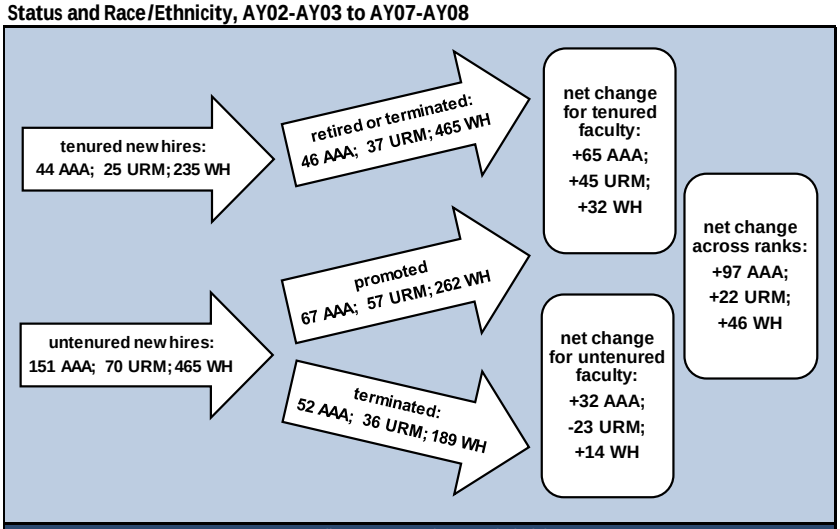


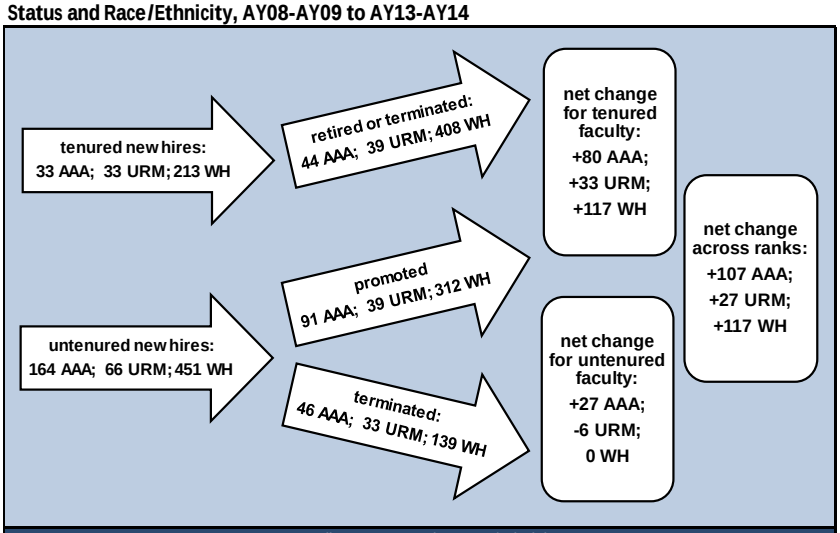
Figure 4a - UM Faculty (Campus-wide) - Change in Number of Tenure Track Faculty by Tenure Status and Race/Ethnicity, AY02-AY03 to AY07-AY08



Overall Percentages by Race/Ethnicity

All New Hires	Promotions to Tenure	All Terminations/Retirements
20% A/AA	17% A/AA	12% A/AA
10% URM	15% URM	9% URM
71% WH	68% WH	79% WH

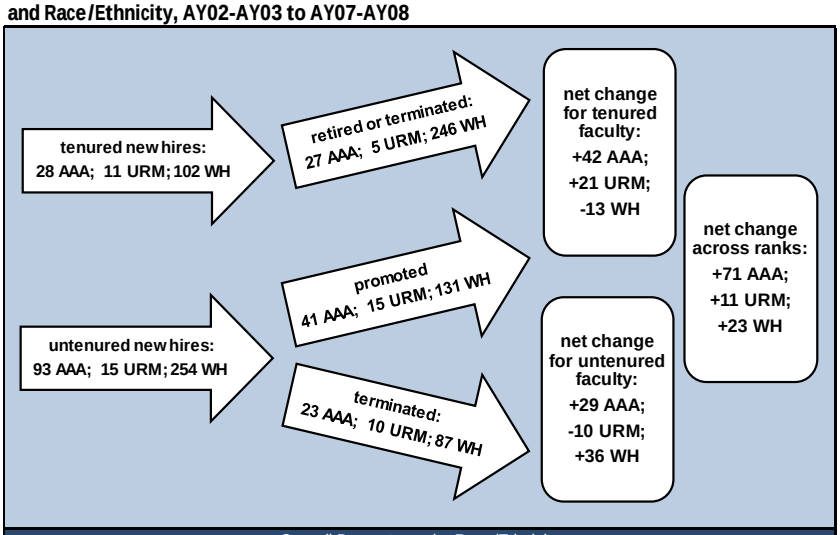
Figure 4b - UM Faculty (Campus-wide) - Change in Number of Tenure Track Faculty by Tenure Status and Race/Ethnicity, AY08-AY09 to AY13-AY14



Overall Percentages by Race/Ethnicity

All New Hires	Promotions to Tenure	All Terminations/Retirements
21% A/AA	21% A/AA	13% A/AA
10% URM	9% URM	10% URM
69% WH	71% WH	77% WH

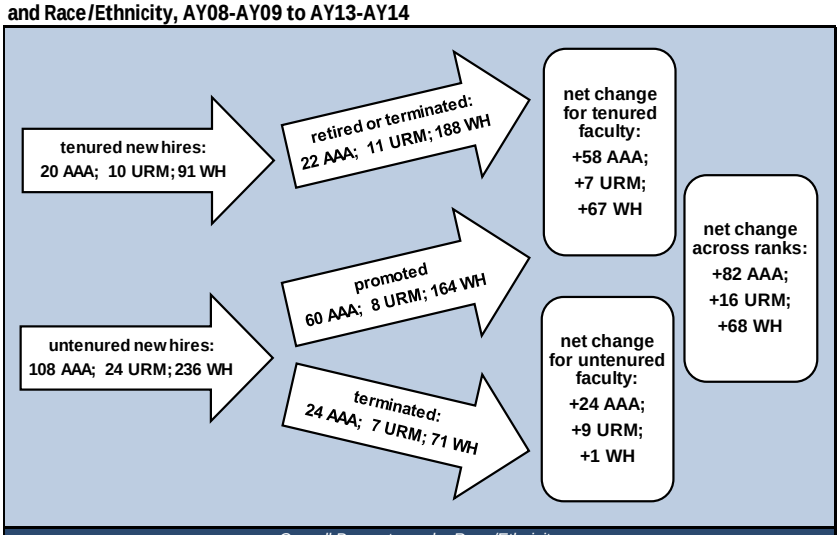
Figure 5a - UM Faculty (STEM) - Change in Number of Tenure Track Faculty by Tenure Status and Race/Ethnicity, AY02-AY03 to AY07-AY08



Overall Percentages by Race/Ethnicity

All New Hires	Promotions to Tenure	All Terminations/Retirements
24% A/AA	22% A/AA	13% A/AA
5% URM	8% URM	4% URM
71% WH	70% WH	84% WH

Figure 5b - UM Faculty (STEM) - Change in Number of Tenure Track Faculty by Tenure Status and Race/Ethnicity, AY08-AY09 to AY13-AY14



Overall Percentages by Race/Ethnicity

All New Hires	Promotions to Tenure	All Terminations/Retirements
26% A/AA	26% A/AA	14% A/AA
7% URM	3% URM	6% URM
67% WH	71% WH	80% WH

DEPARTMENT SEX and RACE-ETHNICITY RATIOS

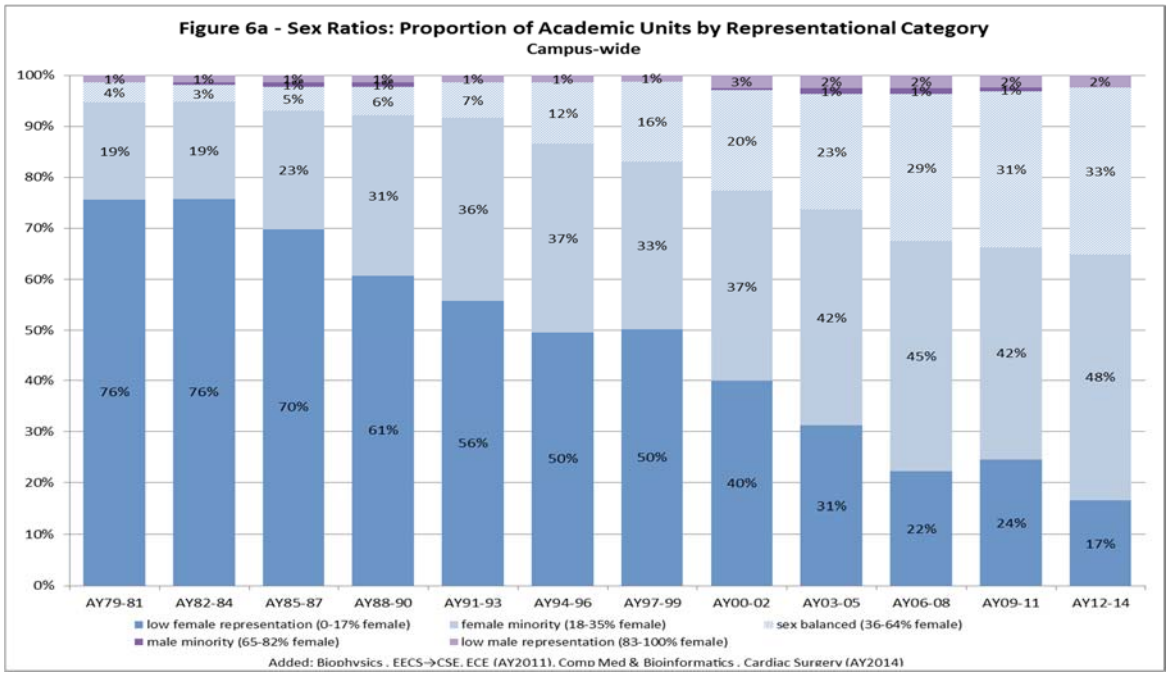
In addition to assessing faculty composition campus wide we considered the makeup of individual departments. Following a procedure suggested by Frehill et al[3], we assessed the sex ratio (percent of faculty by gender) and race/ethnicity ratio (percent of faculty by race/ethnicity) within each department. The categories were developed to reflect the representation of these groups in the population more generally. Sex ration categories are defined as follows: low female representation (0-17% female); female minority (18-35% female); sex balanced (36-64% female); male minority (65-82% female); and low male representation (83-100% female)[4]. The race/ethnicity categories are defined as: low underrepresented racial/ethnic group representation (0-9%); underrepresented racial/ethnic group minority (10-19%); and underrepresented minority group full representation (20% and over). Ideally, successful departments would be sex balanced (that is, 36-64% female) and underrepresented minority group would be "fully represented" (that is, more than 20% from an underrepresented racial/ethnic group). However, consideration may need to be given to the specific availability of women and underrepresented minorities in the pipeline for particular fields when assessing the "success" of particular departments.

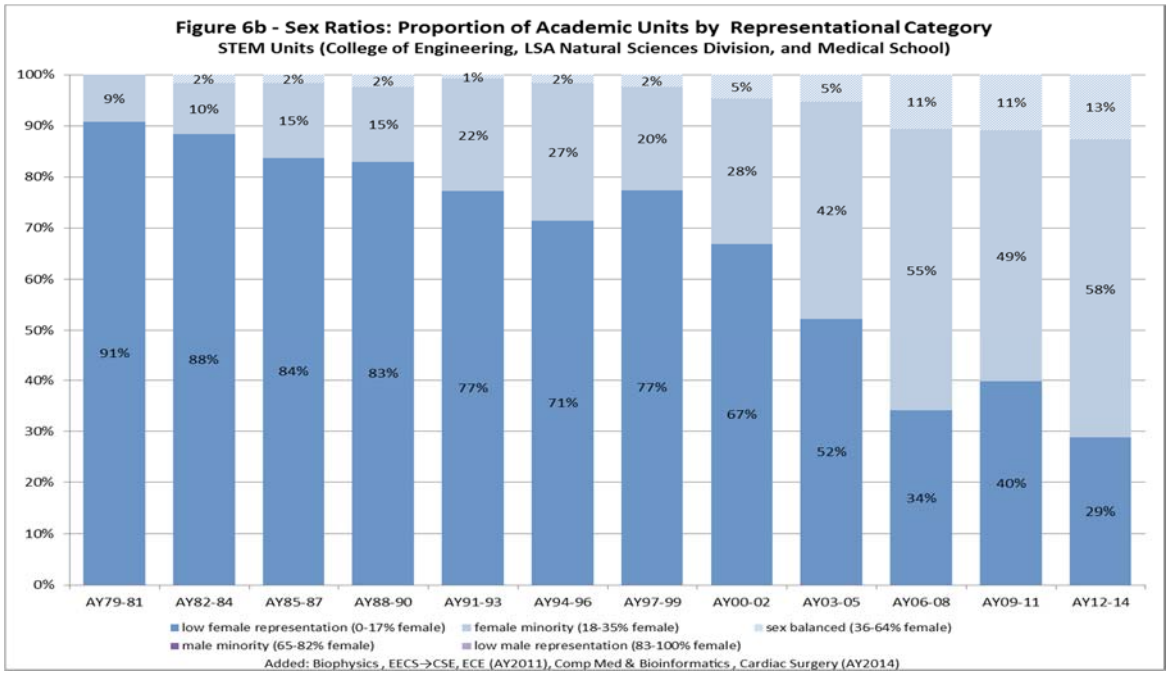
Figure 6a (on next page) documents the percentage of departments campus-wide that reflect each of the sex ratio categories from AY1979 through AY2014; years are grouped in three year averages for ease in viewing. The figure shows a clear over time decline in the percentage of departments with low female representation and an increase in departments that have female minority representation (from a low of 19% to 48%) and that are sex balanced (from a low of 3% to 33%)[5]. More specifically, significant change occurred over the AY1988-90 to AY1997-99 period. During that period the percentage of low female representation departments moved from the earlier 70% range to the 50% range. Perhaps even more significant was the rate drop from AY2000-02 to AY2012-14 when it went from 40% to 17%. In contrast, the percentage of male minority and low male representation departments was very low and fairly constant across this 36-year period.

STEM departments by sex-ratio category are illustrated in Figure 6b. The pattern is similar to that found for faculty campus-wide; that is, fewer low female representation departments and more female minority and sex balanced department over time. However, the percentage of low female representation departments starts out at a much higher level compared to departments campus-wide (91% vs. 76%) and decreases at a slow rate through AY1997-99. Beginning with AY2000-02 (and the beginning of the ADVANCE Program), however, the decline is deeper, dropping from 67% for the AY2000-02 period to 29% for the AY2012-14 period. Also during the most recent time period the percentage of female minority departments increased from 28% in the AY2000-02 period to 58% in the

[3] Frehill, L. M., Jeser-Cannavale, C., & Malley, J. E. (2007). Measuring outcomes: Intermediate indicators of institutional transformation. In A. J. Stewart, J. E. Malley, & D. LaVaque-Manty (Eds.), *Transforming science and engineering: Advancing academic women* (298-317). Ann Arbor, MI: University of Michigan Press.
[4] Due to the small number of female faculty, an addition/loss of one female will result in a larger corresponding percentage change than if that addition/loss had been one male.
[5] It is important to note that the absolute number of departments increased over this time period. Campus-wide the number increased from 69 to 85; for STEM faculty the increase was from 40 to 48.

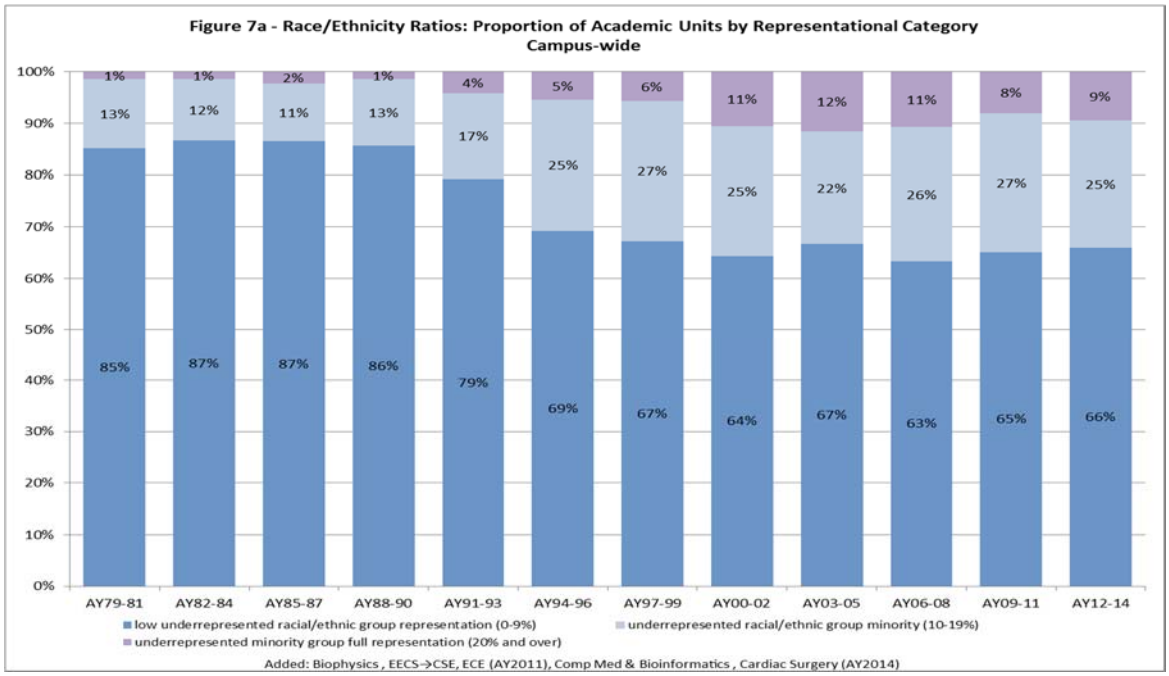
AY2012-14 period. [However, it is useful to note that campus-wide the percentage departments in the low representation category that were in STEM disciplines increased over time (from 69% in AY79-81, to 98% in AY12-14).] Rates for sex balanced departments increased more modestly (5% to 13%).

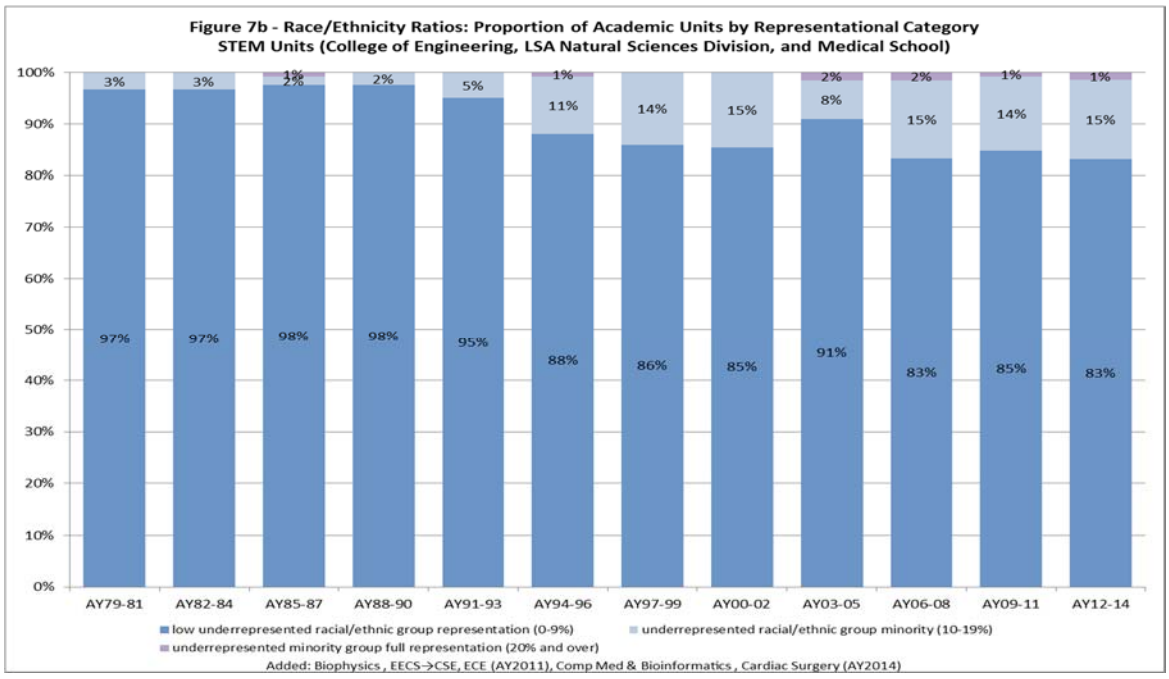




Figures 7a and 7b provide the same analysis by department for race/ethnicity categories campus-wide and for STEM departments. In this case the percentage of low URM representation was quite stable from AY1979 through AY1987. Beginning in AY1991 there is a modest decline campus-wide that remains fairly stable through AY2014. With the decline in low URM representation departments there is a

corollary increase in URM minority representation departments (generally 25%) and a slight, yet less stable increase in URM full representation departments. Analysis of STEM departments reveals a high number of departments with low URM representation across the 36 year, from 97% in AY1997-99 to 83% in AY2012-14. The decline generally occurred toward the end of the 90s (AY1994-96). Rates of URM minority representation increased slightly at this same juncture, while rates of URM full representation hovered between 0% and 2% across the 36 years.





FACULTY COMPOSITION - ADMINISTRATIVE POSITIONS

We also examined faculty composition in administrative positions by gender and race-ethnicity to assess faculty representation in these positions and to consider change over time. Opportunity for leadership was examined campus-wide by considering the demographic makeup of college and University-level administrative positions filled by tenured faculty (e.g., dean and associate dean, provost and associate provost, president and vice president) for the period AY2002 through AY2014 (the only time period for which we have data; we anticipate being able to collect earlier data this year).

Figure 8a reports the percentage (and number) of faculty by gender in college and university level administrative positions at three-year intervals from AY2002 to AY2014. In AY2002 66% of college and university administrators were men and 34% were women. The rates remained fairly stable from AY2002 to AY2014, with a slight decrease in the percentage of administrators who were men (60% in AY2012) and corollary increase for women (40% in AY2014) which may result from the slightly higher net increase in tenured women faculty over this time period (see figures 2a and 2b).

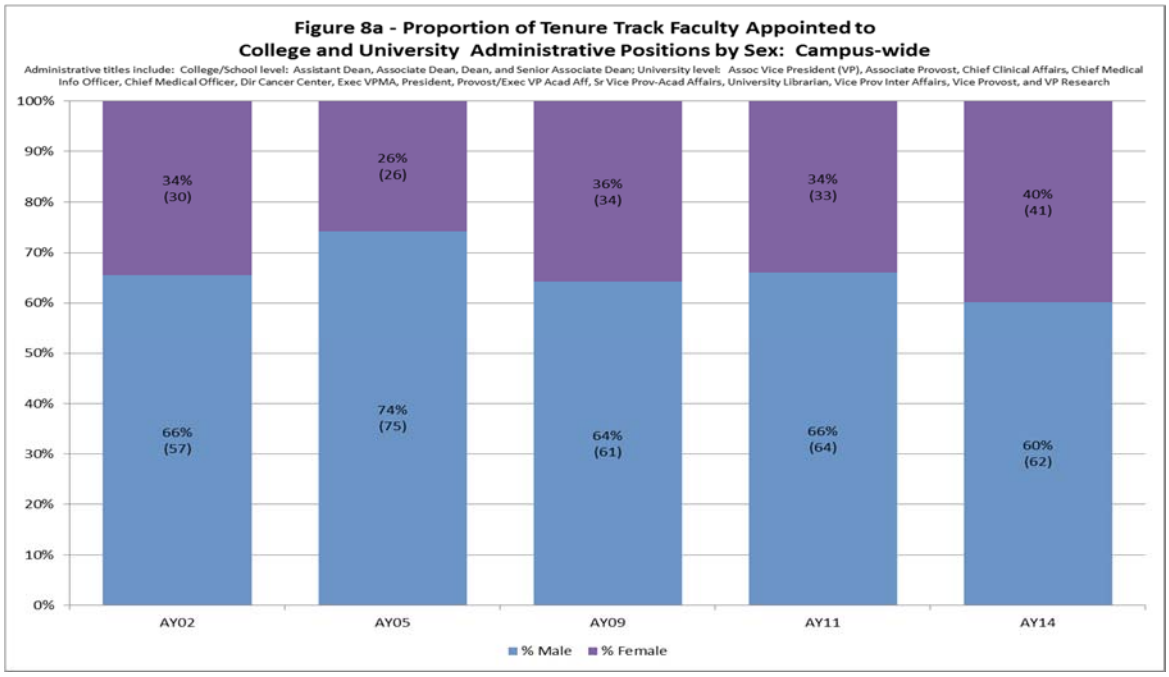
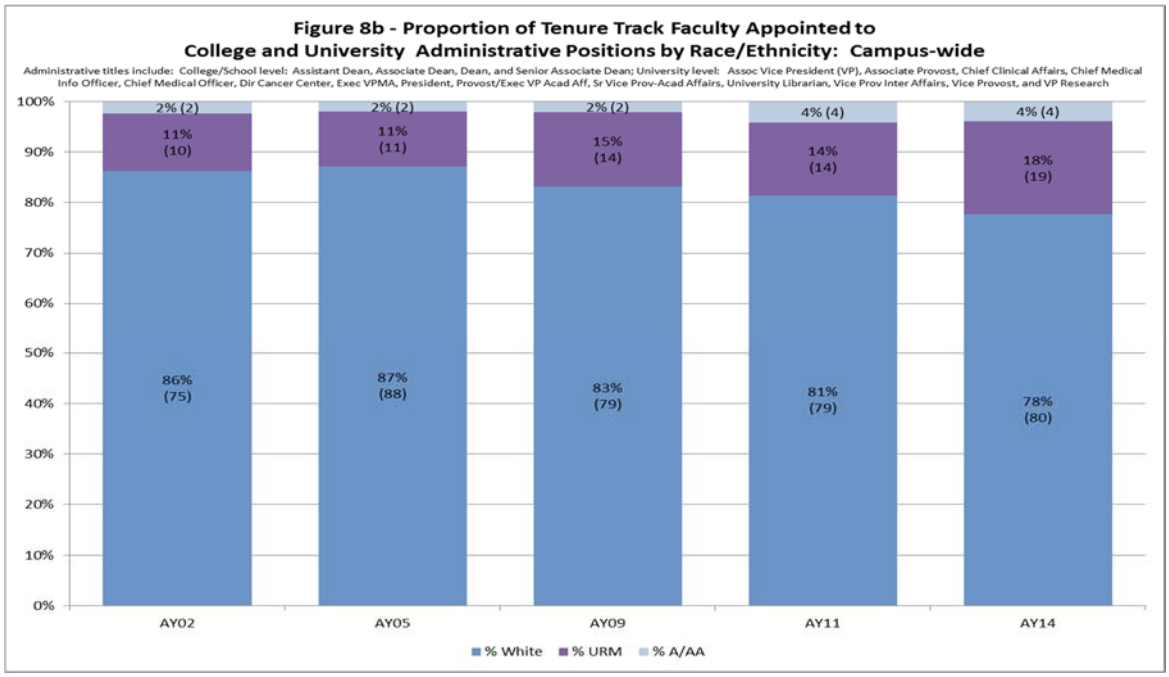


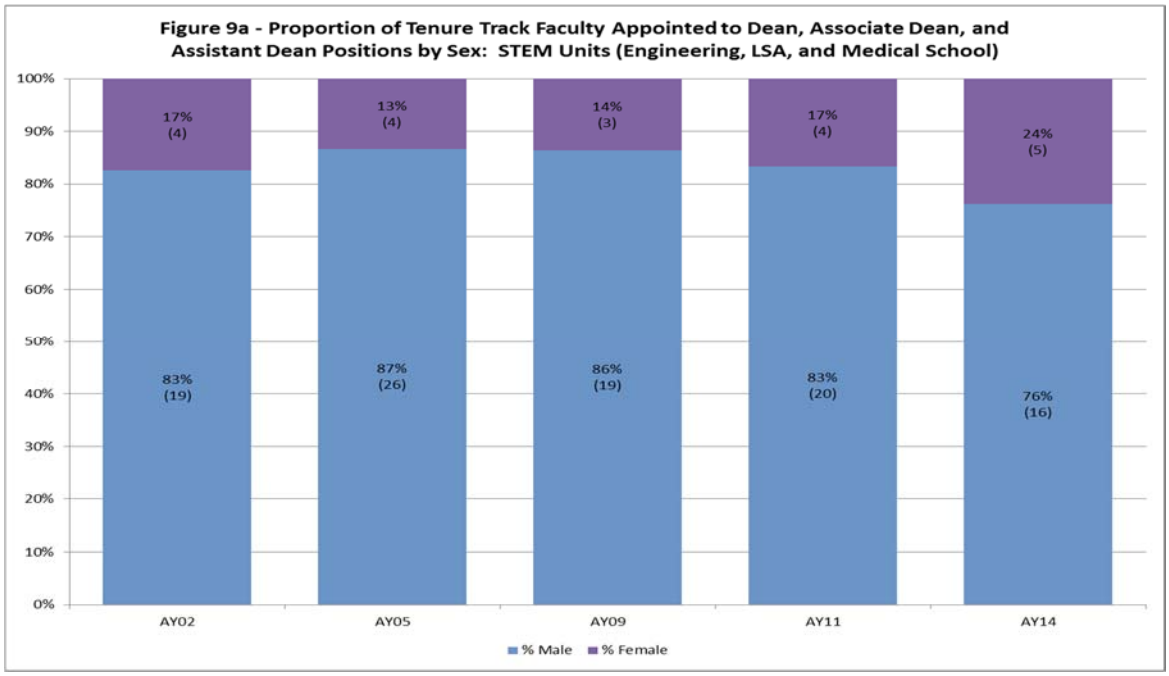
Figure 8b provides the same information by race-ethnicity groups campus-wide. Most positions were held by white senior faculty across the time period; there was, however, an over time decline. In AY2002 86% of the faculty in college and university administrative positions were white; in AY2014 the rate was 78%. This decline was matched by an increase in the percentage of administrators who were URM senior faculty (from 11% in AY2002 to 18% in AY2014). In contrast, the percentage of college and university administrators who were Asian/Asian-American remained stable and low across this time period (2% in AY2002 and 4% in AY2014). Moreover, Asian/Asian-American senior faculty served as high level administrators at a lower rate than both white and URM faculty: in AY2014 2% of all senior

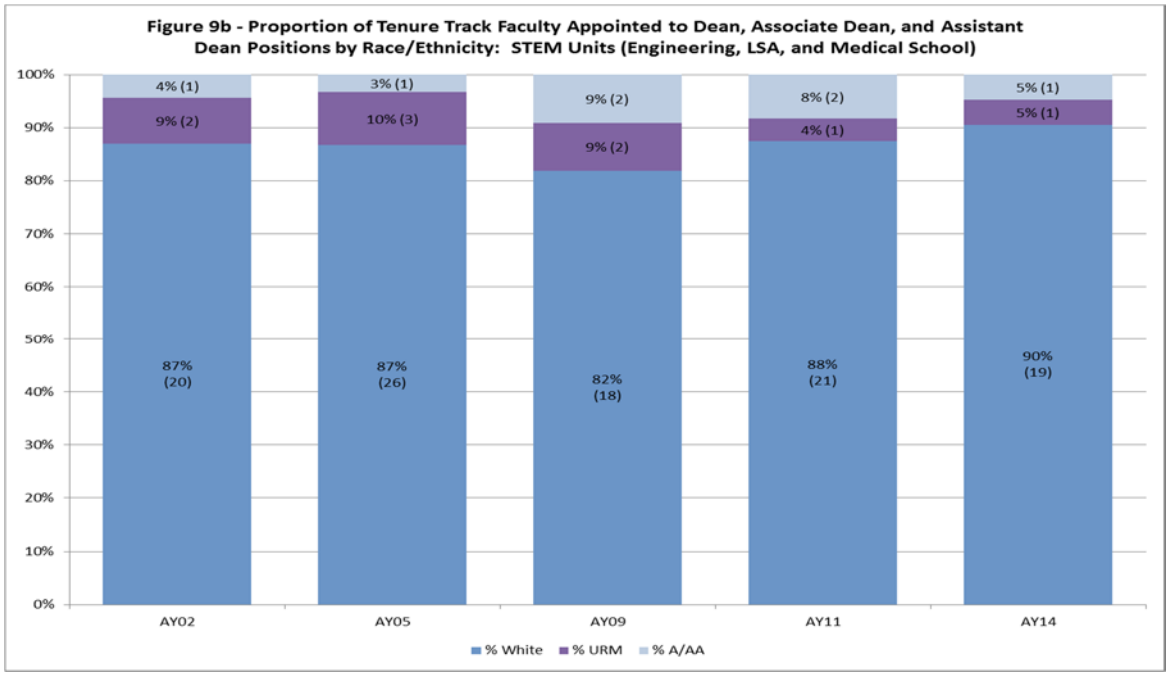
Asian/Asian-American faculty held high level administrative positions; the rate was 14% for senior URM faculty and 6% for senior white faculty.



To address this question with STEM faculty we considered tenured faculty positions at the school/college level (dean, associate dean and assistant dean). Figure 9a reports these data by gender for the period AY2002 to AY2014 at three-year intervals. Similar to the campus-wide data, most of these positions were held by men across the time period; there was a slight increase from AY2002 (when 83% were men) to AY2005 (87% were men) and then a decrease to its lowest rate in AY2014 (76%).

Figure 9b provides the same information by race-ethnicity groups. In this case the percentage of senior college administrators who were white increased over time (from 87% in AY2002 to 90% in AY2014). Rates for other groups were low across the time period. The percentage of college administrators who were senior URM faculty decreased and that for Asian/Asian-American faculty increased slightly and then decreased to earlier levels; these changes are all due to tiny changes in number of faculty.



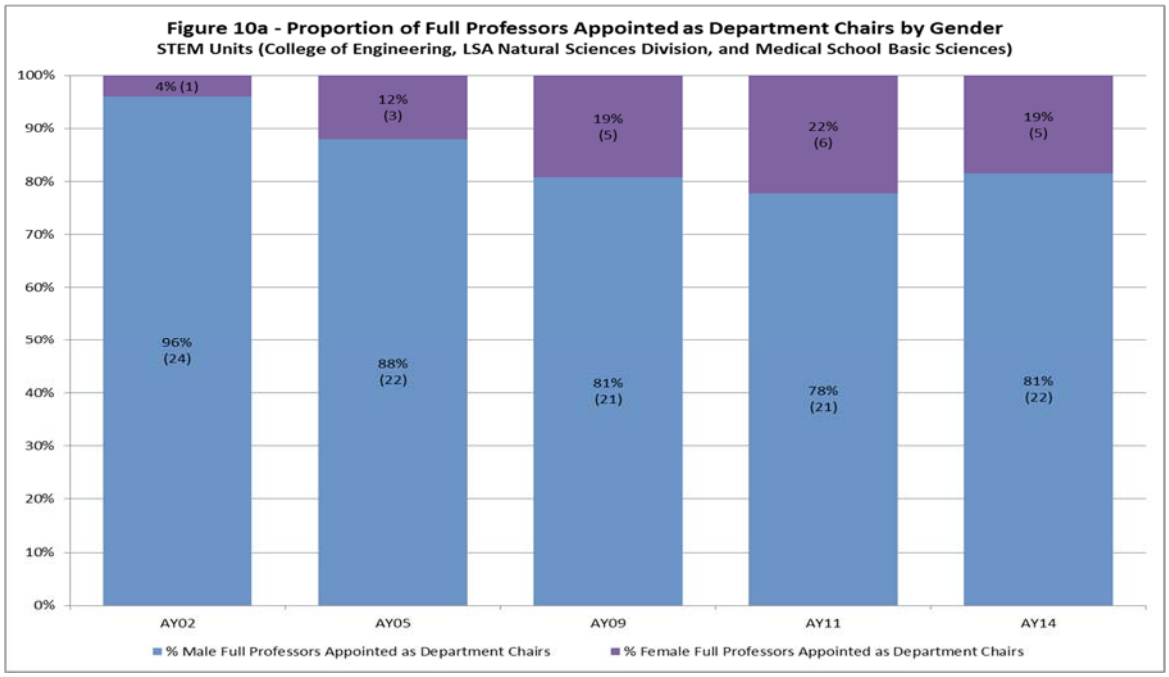


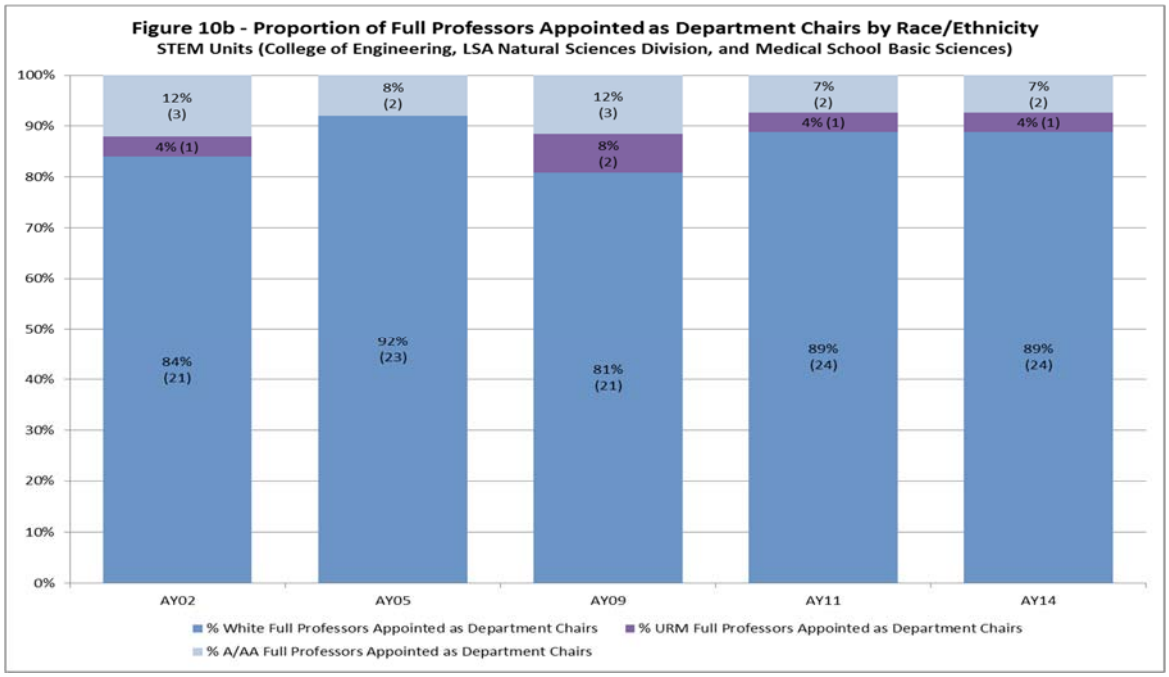
For STEM faculty we were also able to consider the department level administrative position of chair (we do not yet have these data campus-wide[6]) by gender and race-ethnicity. Figure 10a reports the percentage (and number) by gender of STEM faculty at the full professor rank who served as department chairs at the same five time points: AY2002, AY2005, AY2009, AY2011. The percentage of chairs who were women was quite low (4%) and less than that for chairs who were men (96%) in

[6] These data were initially collected as part of required annual reporting to NSF; the ADVANCE Program continues to collect this information for STEM faculty and plans to generate the same data campus-wide.

AY2002; beginning in AY2005, the rate of women who were chairs increased; by AY2014 the rate was 19% (compared to 81% of chairs who were men).

Figure 10b provides the same information by three race-ethnicity groups. The percentage of chairs who were white remained fairly stable, though increased slightly (84% in AY2002 and 89% in AY2014). Rates of chairs who were Asian/Asian-American were low and decreased (from 12% in AY2002 to 7% in AY2014). Similarly rates for URM faculty were low and fairly constant (4% at most time points), but varied due to minor changes in small numbers.





SUMMARY and CONCLUSIONS

The data on faculty composition suggest there has been a moderate increase in faculty diversity over the period that we have examined, and there is an inflection after 1989. This increase is no doubt the result of many factors, including the higher rate at which white men are retiring from the University, and initiatives undertaken throughout the 1980s and 1990s. In addition it appears that the ADVANCE Program-related activities and initiatives directed at increasing the representation of women in STEM fields may have had a positive effect on faculty composition in STEM colleges and departments, which showed more change in the post-ADVANCE period. Moreover, without continuation of the Program it is likely that change would stagnate.

The department sex and race-ethnicity-ratio analyses are particularly important because they document the composition of the face-to-face communities of the faculty. The data suggest an over-time move away from departments where women have low representation and "token" status, and an increase in fuller representation campus-wide as well as for STEM departments (however, sex balanced departments continue to be less well-represented, especially in the STEM fields). Representation by race-ethnicity showed a similar, but less robust, decline in low URM representation departments. Moreover, low URM representation departments continued to predominate, especially in STEM fields (83% in AY2012-14) and the percentage of URM full representation STEM departments was miniscule.

Most high level administration positions continue to be held by white men; there has, however been a slight decline over time generally, except in the case of STEM departments, where the percentage of college administrators who are white has increased and the percentage who are faculty of color has decreased. It is worth noting that, campus-wide, women full professors served in these administrative positions at a higher rate than men across all years: in AY2014 the number of male administrators was 5% of all male full professors and the number of female administrators was 10% of all female full professors. Thus, increasing the representation of women at senior levels should help address the small number of women in these leadership positions. In contrast, Asian/Asian-American senior faculty served as high level administrators at a lower rate than both white and URM faculty: in AY2014 2% of senior Asian/Asian-American faculty held high level administrative positions; the rate was 14% for senior URM faculty and 6% for senior white faculty.

Overall, the data suggest some increase in faculty diversity over the period examined here, especially in the increased representation of women in STEM fields, and a shift away from departments where women have only token status. Nevertheless, there are some clear challenges. The representation of women in STEM fields, as well as campus-wide, still lags considerably behind that of white men. In contrast to women, the representation of faculty of color (both underrepresented minority and Asian/Asian American faculty) has shown little change over time and Asian/Asian American faculty are not well represented in higher level administrative positions, compared to their white colleagues.

The positive changes we see with respect to women in STEM fields (increased hiring and offer acceptance rates, and more STEM women as department chairs) suggest the value of intentional

programs such as ADVANCE and earlier initiatives, and underscore the need to maintain the momentum such programs generate. Challenges remain, both in the case of women and faculty of color, to ensuring a fully diverse faculty at the University of Michigan.

Institutional Indicators Required by NSF ADVANCE

1. n (%) of women faculty in S & E by department
2. n (%) of women in tenure-line positions by rank/department
3. tenure promotion outcomes by gender
4. years in rank by gender
5. time at institution and attrition by gender
6. n (%) of women in S & E who are in non-tenure-track positions
7. n (%) of women S & E in administrative positions
8. n of women S & E faculty in endowed/named chairs
9. n (%) of women S & E faculty on promotion and tenure committees
10. salary of S & E faculty by gender (with controls)
11. space allocation of S & E faculty by gender (with controls)
12. start-up packages of newly hired S & E faculty by gender (with controls)