

A National Analysis of **MINORITIES**
in Science and Engineering Faculties
at Research Universities

by

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supervising

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EXECUTIVE SUMMARY

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The first national and most comprehensive demographic analysis to date of tenured and tenure track faculty in the top 100 departments of science and engineering disciplines shows that minorities and women are significantly underrepresented. There are relatively few tenured and tenure-track underrepresented minority (URM) faculty in these research university departments, even though a growing number and percentage of minorities are completing their Ph.D.s. Qualified minorities are not going to faculties of many science and engineering disciplines. However, in some engineering disciplines, there is a better match between the percentage of URMs in recent Ph.D. attainment versus among assistant professors. The percentage of URMs in science and engineering B.S. attainment generally continues to increase, but they are likely to find themselves without the minority faculty needed for optimal role models and mentors.

There are few minority full professors in the physical sciences and engineering disciplines studied; the highest percentage of all URMs combined among full professors is less than 5% (chemical engineering). Comparing the representation of URMs among assistant professors in the top 50 departments, versus those in the next group of 50, gives mixed results; in engineering, the top 50 departments have higher percentages of URMs, while the top 50 chemistry, math, and computer science departments have much lower representations of URMs. In each discipline except biological sciences, the percentage of White males in top 50 departments is about equal to or greater than in the next group of 50.

URM women faculty, especially “full” professors, are almost nonexistent in physical sciences and engineering departments at research universities. Surprisingly, most of the few female minority full professors in those disciplines were not born in the U.S.

In most disciplines studied, the percentage of URMs among recent Ph.D. recipients is significantly above their percentage among assistant professors; exceptions include civil engineering and mechanical engineering. In the top 50 departments of chemistry and math, the percentage of Hispanic and Native American faculty among assistant professors is lower than among associate professors, revealing a decline in hiring these minorities. In contrast, in all disciplines studied, the highest percentage of female faculty is at the level of assistant professor, as a result of increased recent hiring of women.

In most disciplines, URM faculty are so few that a

minority student can get a B.S. or Ph.D. without being taught by or having access to a URM professor in that discipline. However, there is a disproportionate number of White male professors as role models for White male students. For example, in 2005, 16.7% of the students graduating with a B.S. in chemistry were URMs, but in 2007, only 3.9% of faculty at the top 100 chemistry departments were URMs. For females, those data are 51.7% and 13.7%, respectively. In contrast, the corresponding percentages for White males are 37.4% and 74.2%, respectively. While the percentages of women and of URMs in science and engineering Ph.D. attainment have increased in recent years, the White men still dominate the corresponding faculties.

A cycle is perpetuated. Minorities are less likely to enter and remain in science and engineering when they lack mentors and role models. In most science and engineering disciplines, the percentage of URMs among faculty recently hired is not comparable to that of recent minority Ph.D.s. and is far below that of recent BS recipients. This results in fewer minority faculty to act as role models for minority students. Minority students observe this in the course of sampling the educational environment. If minority professors are not hired, treated fairly, and retained, minority students perceive that they will experience the same. This will not encourage them to persist in that discipline.

Trends in data for women are very similar to those observed for URMs, but more obvious due to greater magnitudes. Therefore, the most useful comparisons may be those for representation of women across disciplines. For example, in the top 100 departments, the representation of females among professors in chemistry, versus astronomy or earth sciences, is lower at each rank. The ratios of chemistry: astronomy: earth science are 21.2%: 25.3%: 28.2% for assistant professors, and 13.7%: 15.8%: 16.5% for professors of all ranks combined. However, the representation of female students in chemistry is and has been higher than that of astronomy or earth sciences for years (51.7%: 42.4%: 41.9% for B.S. in 2005, and 32.4%: 22.7%: 31.8% average for Ph.D.s in 1996 – 2005). Astronomy and earth science may have desirable hiring practices which could be used by other disciplines.

Using these data to identify points of strength and challenge for each discipline could guide the search for programs, resources, and attitudes which are responsible for the results. We hope this will facilitate the transfer of good practices among disciplines.