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Diversifying the Engineering Workforce

Engineering has a “diversity” problem. Disaggregated data on enrollment, retention, and degrees awarded demonstrate a chronic pattern of underrepresentation by minorities and women. Today, not tapping the full range of student talent means that graduates and faculty look increasingly unlike the global clientele for engineering products. From student interest to workforce participation, indicators suggest that engineering lags the sciences (which itself has a less-than-stellar record in diversity). To remedy this, higher education must become “culturally competent” and held accountable for educating the students it enrolls.

There is a knowledge base of programs and practices on which institutions can draw. Yet analysis reveals that few universities are responsible for educating the lion’s share of minority and women engineering graduates at the baccalaureate and doctoral levels. Some of these institutions, known as Historically Black Colleges and Universities (HBCUs) or Hispanic-serving Institutions (HSIs), support ethnic populations at the undergraduate level. But several public and private research universities, such as Georgia Tech, North Carolina State, Texas A&M, MIT, NJIT, and Colorado-Boulder, excel in graduating engineers from one or more ethnic groups. All should be considered “minority-serving.”

Supporting students along the engineering pathway thus requires attention to academic preparation and the various transitions benchmarked by degrees, internships, and workforce entry. Diversifying the engineering faculty beyond the current proportion that is women and minority (less than 15% combined) and creating a campus climate that is conducive to mentoring and academic success remain formidable cultural issues. Without the conviction that the climate can change, we succumb to an interpretation (and forecast) that institutional racism, indifference, or significant admissions errors will persist.

Ultimately, leadership in the academic and corporate sectors representing engineering producers and employers must diversify the engineering workforce or face what has been called a “graceful decline.” The authors further recommend a research agenda that focuses on the image of engineering and outreach to precollege populations, describes the climate for academic success, monitors institutional performance in retention-to-graduation for students disaggregated by ethnicity and gender, and builds on federal programs that have taken root on campuses across the U.S.

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