

Portraying Success Among URM Engineering Majors – Summary

The University of Oklahoma (OU) attracts a substantial population of students from under-represented minority (URM) populations, including an unusually high proportion of Native American students (7%). As is common across the country, OU as a whole, and the College of Engineering (COE) in particular, have achieved differential levels of success in graduating students from these populations. This project will study these patterns, focusing on the questions (1) What systemic factors contribute to the success of URM students in engineering at large, predominantly white universities? and (2) What systemic factors contribute to differential success between URM populations? To preserve a national perspective, OU will partner with Arizona State University (ASU) and the University of Pittsburgh (Pitt). Furthermore, an external advisory board will inform the collection and analysis of data, as well as the interpretation and dissemination of results.

Intellectual Merit: Given the context, this research will build on and expand prior research in very specific ways. First, research and interventions have routinely either focused on only one population or addressed URMs as a unit without taking into account differential needs and perspectives among the populations. Second, much of the scholarship related to URM participation in STEM fields has focused on factors related to loss from the pipeline. However, although engineering graduation rates are not as high as desired, OU, ASU, and Pitt have collectively achieved atypical levels of success with URM populations. Thus, this group is in an unusual position both to disaggregate similarities and differences among populations and to identify factors related to success as well as those systemic factors that need improvement.

A student's opportunities, options, and choices are affected by a complex web of factors. We have sorted our target factors into the following overlapping categories: (1) race/ethnicity; (2) attributes of engineering as a field; (3) student's background; (4) attributes of academic communities; (5) attributes of personal support structures and responsibilities; (6) attributes of student communities; and (7) student's future. In addition to examining patterns in quantitative data, qualitative data will be longitudinal and open-ended from interviews with students, faculty, advisors, and program directors, as well as observations of student group activities and student communities. These open-ended data will allow investigation of the student experience in a holistic way, guided by factor categories distilled from the literature and the expertise of the research team (OU, ASU, Pitt, advisory board). This team has experience with this model from work related to a grant from the NSF Research on Gender in Science and Engineering program.

Broader Impacts: This proposal is submitted through the OU-based K20+ Center for Educational and Community Renewal. The team is multidisciplinary (e.g., engineering, education, STEM education research, and African and African-American studies), cross-institutional (OU, ASU, and Pitt), and systemic (e.g., personnel include the Director of Engineering Education (OU) and two Associate Deans of Engineering (ASU and Pitt)). The research will contribute to the knowledge about increasing URM persistence in STEM undergraduate majors and will inform intervention efforts and future research directions. We will disseminate to faculty, administrators, policy makers, and parents by way of sessions and workshops at conferences, journal articles, campus-wide teaching seminars and other instructional development initiatives, the K20+ Center network, and appropriate websites.