

**PROMPT:** Undergraduate Research Experiences.

**Title: Professional Attributes Gained as a Result of Research Experiences for Undergraduate Chemical Engineering Students at a Hispanic-serving Institution**

**Author: Matthew Alexander, Associate Professor, Texas A&M Univ-Kingsville**

One important attribute of graduate engineers that leads to early success in new professional employment is the ability to work independently. Thus, an important aspect of a student's undergraduate academic career is engaging in experiences that provide opportunities to develop this attribute. Undergraduate research experiences at the university level frequently instill the attribute of successful independent work in students. At our Hispanic-serving institution, there are numerous opportunities for our undergraduate engineering students to become involved in undergraduate research. Our university has ongoing programs for McNair research scholars, sponsored by the Department of Education, and Research Experiences for Undergraduates, sponsored by the National Science Foundation (NSF). Periodic funding from other outside sources provide other opportunities for engineering students to engage in undergraduate research, such as the NSF Centers for Research Excellence in Science and Technology (CREST) and the Greater Texas Foundation. Additionally, there are internal university funding opportunities that arise as circumstances and funding dictate, such as \_\_\_\_\_ Council for Undergraduate Research and the President's Undergraduate Research Program. This variety of programs for undergraduate student research support provide numerous opportunities for engineering students to engage with faculty mentors and take on research problems in their own areas of interest.

In the Chemical Engineering department at this Hispanic-serving institution, we regularly have between five and ten students performing research under a department faculty member for one or more semesters in any given academic year. An obvious outcome from student involvement in undergraduate research is the development of the student's interest to pursue graduate study, as well as self-confidence in one's ability to be successful in that academic course. Roughly three to five BS graduates per year from our chemical engineering decide to pursue graduate school at this institution or other institutions. Over the last five years, four students have been accepted to Tier 1 research institutions to pursue MS or PhD in chemical engineering. Additionally, in the last five years, we have had one Fulbright Fellowship and one NSF Graduate Research Fellowship Program awardee amongst our BS graduates currently in graduate school. There are roughly ten BS graduates from our program that are currently in graduate school, with some of these pursuing or having recently completed programs in other areas besides chemical engineering, such as environment, materials, or industrial engineering, medical school, and MBA programs. This variety of results attests to the students having gained self-confidence and an ability to work independently as a result of their undergraduate research experience. Of course, some of our undergraduate researchers pursue full-time professional employment rather than graduate school after graduation. Again, their self-confidence and ability to work independently gained from the research experience serves them well in the professional environment. Although our university is a small university in the state system, our graduates in professional positions report that they are confident in their work performance when comparing themselves to chemical engineering graduates that come from larger and more well-known institutions in our region.