

## **Future Teachers, Researchers and Engineers: Improving Retention and Success Rate of STEM Graduate Program through a Career-Oriented Approach**

The University of Texas at Brownsville and Text Southmost College (UTB/TSC) is a public 4-year university that serves more than 17000 students, over 90% of which are Hispanic coming from the Rio Grande Valley (RGV) region in south Texas. While RGV is a region of tremendous potential for growth in terms of human capital (the first in the nation) and in terms of contributions this population can make to the state and the nation, such potential cannot be realized without the intellectual and educational resources that have been historically lacking. The region is still plagued with a dismaying poverty rate of 36.5% in 2008. There is an extremely urgent need in RGV to provide affordable post-secondary education, and produce high-quality graduates with promising employability, in order to bring radical changes to the local economy.

To respond to such severe regional situation as well as the national imperative to promote postsecondary education for Hispanic American, UTB/TSC proposes a PPHOA project to improve its graduate programs in computer science (CS) and math as an effort to expand postbaccalaureate educational opportunities for Hispanic Americans and contribute to the bootstrapping of regional economy. The project aims to (1) improve the retention and graduation rates of Hispanic and low-income graduate students in CS and math; (2) improve the employability including the ability for Ph.D. study of Hispanic and low-income students upon their graduations; (3) attract more Hispanic and disadvantaged students to enter into STEM fields.

The project goal will be achieved through an integration of proven best practices including: (1) **course development** consisting of online course development to facilitate convenient access to these courses and improve students' retention rate, and new course development and course redesign in emerging areas such as bioinformatics, cyber security and distance education in mathematics that will greatly benefit students' future employment and/or further academic careers; (2) **faculty mentored research** to engage students in research and keep them motivated and focused on their graduate study to prompt success; (3) **high-school outreach and teaching activities** to build linkages among CS or math students towards teaching in high-schools and motivate them to pursue a teaching career, as well as to attract more high-school teachers/students to pursue CS and math undergraduate/graduate degrees; (4) **summer internship program** to enable students to get first-hand industry experience through internships and to be more employable upon graduation; (5) **invited speaker series** where successful minority students, scholars and industry leaders will be invited as role models to UTB/TSC to have dialogues with our participating students to inspire them to pursue advanced study in STEM; (6) **teaming graduate students with undergraduate students** in research project as well as in regular academic life through "buddy-mentoring" in order to not only develop the leaderships of graduate students but also engage undergraduate students to strengthen and widen the pipeline in CS and math through graduate degrees.

Upon successful execution of the project, we anticipate the project outcomes to be significant increases in the enrollments, retention and graduate rates, as well as immediate employment rates in the CS and math graduate programs. We also anticipate an increased portion of our graduates to go on to pursue Ph.D. degrees.