Project Summary

Project Title: Elementary Teachers Engaged in Authentic Math and Science (ETEAMS)
Lead Partner: Texas A&M University-Corpus Christi (TAMUCC)
Core Partner: Corpus Christi Independent School District (CCISD)
Proposal Type: Prototype Targeted Partnership
Focal Area: K-12 STEM Teacher Preparation

Texas A&M University - Corpus Christi (TAMUCC), together with Corpus Christi Independent School District (CCISD), proposes the **Elementary Teachers Engaged in Authentic Math and Science (ETEAMS)** partnership. The purpose of ETEAMS is to test an innovative model for improving grades 4-8 STEM education by recruiting *preservice elementary education teachers* into a field-based fellowship program for *middle level mathematics and science* instruction.

The partnership will support preservice elementary teachers in middle levels STEM teaching fellowships. Starting during the final year of a generalist teacher education degree program, 120 preservice elementary teachers will participate in annual cohorts of 40 fellows to contribute on **original STEM research projects** on Gulf coast marine ecology, participate in professional development school partnerships to gain **grades 4-8 teaching experience**, complete university workshops for **middle levels mathematics or science certification**, and collaborate with teacher-leaders to increase STEM participation, interest, self-efficacy, and achievement.

Though challenged by high poverty and limited resources, the participating schools, including one middle school and two elementary feeder schools serving a total of 1,900 students (80% Hispanic, 78% economically disadvantaged), are committed to excellence in STEM teaching and learning. ETEAMS addresses this need by **preparing 120 preservice elementary teachers for middle levels STEM teaching** through fellowships supported by 3 teacher education faculty, 6 scientists, 3 mathematicians, 3 science graduate students, 1 university instructional coach, 5 school administrators, and 9 teacher-leaders at partner campuses.

Intellectual Merit: Though almost half of middle level STEM teachers hold generalist elementary teaching certifications (Hill, 2007), ETEAMS will be the first large-scale research project on a middle level STEM teacher preparation program exclusively enrolling preservice elementary teachers. By supporting preservice elementary teachers to add middle level STEM certification without changing majors or delaying degree completion, ETEAMS offers an innovative strategy for improving the quality, quantity, and diversity of early career middle level STEM teachers. The research strand connects program features to effects on early career teachers' STEM-related interests, views on the nature of science, pedagogical content knowledge, and teaching self-efficacy. Matched-group comparisons and structural equation modeling of grades 4-8 student performance and teacher outcomes will provide empirical evidence for implications of the new teacher education model on the science and mathematics performance of underrepresented grades 4-8 STEM students and teachers.

Broader Impacts: High-poverty urban schools lose over 20% of their faculty each year (Ingersoll, 2003), and recruitment and retention of effective middle level STEM teachers are ongoing challenges for most school districts serving underrepresented students. With an evidence-based approach focused on the large population of generalist preservice elementary teachers, ETEAMS will yield an articulate, scalable, and transferable model for middle level STEM teacher preparation. Theoretically-grounded research will contribute to teacher education literature and provide contextualized support for establishing similar programs. Moreover, the program's unique setting among underrepresented populations of teachers and students makes ETEAMS well-prepared to vividly illustrate how an "all hands on deck" partnership can increase engagement of scientists and mathematicians in preservice teacher education while contributing to STEM achievement and the quantity, quality, and diversity of grades 4-8 STEM teachers.