

## **MUREP Inclusion Across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (MUREP INCLUDES)**

**Title: Broadening Participation of Next Generation Aerospace Engineers through Traineeship and Workforce Development Program (BP-AE)**

**Organization: Florida A & M University**

**Primary Investigator: Chiang Shih**

**Summary:** The program proposes the establishment of a multi-institution coalition to recruit underrepresented minorities (URMs) for a coordinated educational and professional enhancement program that will involve them in design projects, undergraduate research experiences, professional traineeship, advanced research, and career development activities in NASA-relevant fields. The coalition is led by Florida A&M University (an HBCU), University of Central Florida (an HSI), and Florida State University (a majority institution) in collaboration with Air Force Research Laboratory–Munitions Directorate (AFRL), and four NASA centers. The research theme focusing on aerospace systems and technologies, including high-speed aerodynamics, combustion, propulsions, active flow control, smart materials, additive manufacturing. These topics fit well with the primary mission of the Florida Center for Advanced Aero-Propulsion (FCAAP), a state of Florida Center of Excellence. FCAAP was formed to train and sustain a highly skilled workforce as well as design and develop new technologies and products for the aerospace enterprise. BP-AE will leverage on FCAAP for expanded recruitment, curriculum development, mentorship, and research collaborations to maximize the overall impact.

The BP-AE coalition will provide intellectual & financial resources, infrastructure, and administrative support to carry out proposed objectives. We will recruit motivated URM students by providing coordinated training and professional development activities. The collaborative partnership by AFRL and NASA centers will provide professional mentorship and real-world experiences needed to prepare for their future careers while addressing the shortage of URM in the aerospace-centric workforce. With the proposed program, we expect to recruit and train 40 BP-AE Fellows (9 graduates and 31 undergraduates) over the total grant period of three years. Annually, recruitment events will be conducted internally within the BP-AE institutions and externally engaging on allied Minority Serving Institutions. The professional development program will comprise of four interconnected activities coordinated with collaborators designed to engage engineering students early and implement during their academic careers through sustained mentorship and workforce development. These activities include: (1) Senior capstone design project sponsorship; (2) summer research and professional development for undergraduate students; (3) MS Traineeship degree integrating internship and project mentorship; and (4) co-advising graduate students' research projects with AFRL and NASA collaborators.

The FAM-FSU College of Engineering (COE), while combining the strengths of an HBCU in FAMU and a major research university in FSU, has established track records in both scholarly activities and recruitment and education of African American and female engineering students. The addition of UCF will further enhance diversity with Hispanic workforce inclusion. The

coalition members have developed long-term partnerships with stakeholders from AFRL, NASA centers, and other relevant institutions in terms of integration of research and education endeavors with demonstrated success. We believe that the proposed BP-AE and its focus on diversity will leverage those accomplishments while working to significantly increase the number of URM and women engineers pursuing advanced degrees and furthering their careers in aerospace-related disciplines.

We will assess the effectiveness of the program by conducting surveys and interviews to generate formative and summative evaluation reports for just-in-time modifications and administrative reviews to ensure program objectives and performance metrics be satisfied. Program results will be widely disseminated to all relevant stakeholders including NSF INCLUDES National Network. The program is expected to be exemplified as a national model for broadening the participation of URM in engineering.