MUREP Precollege Summer Institute (MUREP PSI) Awards – FY2023

Title: DDR-ARTEMIS: Digital Agriculture, Data Science, and Robotics: Applied Research and Training for Enhancing Motivation in Science

Institution: Lincoln University

City/State: Jefferson City, Missouri

PI: Sougata Bardhan

FY: 2023

Summary:
Multiple issues affect the persistence of underrepresented groups in STEM (Allen-Ramdial and Campbell 2014; Chang et al. 2014; Graham et al. 2013). The diversity decreases as one examines subsequent steps in the education-career trajectory, but numbers have increased in recent years. While seventy-two percent of Hispanics and 57% of blacks now enter college (Bureau of Labor Statistics [BLS] 2017a); still only 50% of minorities graduate from college (Education Trust 2015). Only 22.5% of those enrolled in STEM graduate programs in 2015 were from underrepresented minority groups (Okahana et al. 2016). Greater exposure to STEM disciplines and research at an early age has been linked with increased student expectations among diverse student demographic populations to obtain an advanced graduate degree in the sciences and other STEM disciplines. Stavrianeas & Stewart (2022) also stressed the importance of families and school community science counselors in making sure success of minority enrollment in STEM education. With this background, we have designed a unique and comprehensive program which targets families, school science teachers, and finally minority and underserved students to promote STEM education and enrollment. The proposed NASA MUREP PSI summer residential program is designed to offer keys for success for the participating students to advance their career in STEM fields as undergraduate students and beyond and aligns with the mission of the STEM engagement office at NASA (OSTEM).

Two identical, intensive nine-day residential summer camp will be hosted at Lincoln University, a historically black U.S. university, in collaboration with the University of Missouri. Each summer camp will accommodate 12 students for a total of 24 students each year. The educational program will provide hands-on experience for underrepresented minority students in digital agriculture, data science and robotics to develop a broad understanding of STEM careers along with professional development activities and interaction with STEM professionals and entrepreneurs. The planned activities and interactions (total 48.5 hours) will be critical in the development of the future workforce. The students will explore various facets of digital agriculture, robotics, and incorporation of big data, data science, and machine learning as an interdisciplinary, experiential learning curriculum. The nine-day summer residential camp will enhance the attending students' subject matter knowledge and skill development. Interaction and collaboration with renowned scientists from their respective fields will act as a catalyst for the young students to appreciate global scientific challenges.

This training program will build on existing resources, experience, coordinating personnel and student participation to create an exhaustive and enriching summer camp to promote interest in STEM undergraduate studies and professional development activities. We have assembled an interdisciplinary team of scientists to deliver the curriculum over nine-days which will include invaluable interaction with real-life STEM professionals. Each evening the students will take part in session focused on college and professional development activities led by youth development professionals. Apart from that the

students will also interact with STEM professionals from the scientific industry and high-tech entrepreneurs. Based on a national survey conducted by our team, we have also designed a teacher camp to bolster and support minority STEM enrollment in college through curriculum augmentation and classroom interaction. These planned activities will sustain the efforts from this summer camp into the classroom and will continue beyond the duration of this project.