



Minority University Research and Education Project (MUREP)

Institution: California State University-Dominguez Hills

City/State: Carson, CA

Award Name: MUREP Partnership Learning Annual Notification (MPLAN)

Award Number: N/A

Title: Bioinspired Surface Design for Thermal Extremes/ STRG-3: Extreme Environment

PI: Terry McGlynn

PI Email: N/A

Award Fiscal Year: FY2024

Summary:

The extreme temperatures of the lunar surface stress on the integrity of structures and increasing energy demands when inhabited by people. One approach to minimize thermal stress is to design surfaces that to maximize or minimize heat transfer across the electromagnetic spectrum. Using the principles of bioinspired design, this project will investigate thermal properties of surfaces of animals that occupy thermal extremes, to identify microscale and nanoscale features may be used to inspire engineering of structures to maximize or minimize heat transfer. The project will emphasize chitinous exoskeletons of insects and keratinous plumage of birds, which demonstrate substantial variance in near-infrared (NIR) and mid-infrared (MIR) heat transfer. Researchers will leverage the extensive biodiversity collections of the Natural History Museum of Los Angeles County and use a combination of spectroscopy, spectrophotometry, and quantitative infrared photography to identify candidate species. This research is designed to inform engineering efforts to develop durable surfaces that provide thermal resilience on the surface of the Moon.