



Minority University Research and Education Project (MUREP)

Institution: Portland State University

City/State: Portland, OR

Award Name: MUREP Partnership Learning Annual Notification (MPLAN)

Award Number: N/A

Title: Robot Leg Design for Lunar Exploration/ STRG-2: Extreme Access

PI: Alexander Hunt

PI Email: N/A

Award Fiscal Year: FY2024

Summary:

The proposed work seeks to address challenges in developing legged robots for extreme access for use in exploring lunar and other planetary surfaces or subsurface voids. Exploring these areas requires solving a number of challenges associated with locomotion on steep, rocky, sandy, and dusty terrains. Wheels can struggle on these terrains as sand and dust are kicked down the hill by the rolling motion. Legs can lift over obstacles and secure footholds in loose ground for more effective climbing. The proposed work intends to collect data on different foot designs that can climb steep, rocky, and sandy terrain. Additionally, when moving on such terrain, sand and dust can get in joints, causing binding and other structural failures. Artificial muscles can eliminate the need for rotating motors and gears and may enable the development of clever joint designs that eliminate the possibility of dust and sand penetration. The work proposed here will develop improved software design tools for robotic systems with artificial muscles. This proposed research will lead to improved robotic systems able to explore difficult to reach environments on extraterrestrial and terrestrial systems alike.