



Minority University Research and Education Project (MUREP)

Institution: University of California, Irvine

City/State: Irvine, CA

Award Name: MUREP Partnership Learning Annual Notification (MPLAN)

Award Number: N/A

Title: Flexible Modular Robots for Extreme Access/ STRG-2: Extreme Access

PI: Julian Rimoli

PI Email: N/A

Award Fiscal Year: FY2024

Summary:

The funding of this proposal will enable the development of a modular robot demonstrator meant for navigating rough terrain and accessing hard-to-reach places with a hopping locomotion. Existing rovers for celestial exploration use wheels for their simplicity and low power requirements, despite some of their limitations that restrict the terrains they can operate on. Recent progress on designing and controlling robots with novel locomotion modes and actuation mechanisms can open new opportunities by making accessible places previously unreachable to conventional rovers. Robots performing dynamic locomotion simply by deforming their body would not be subject to some of the caveats of wheeled robots, making them potentially able to operate in challenging environments such as on soft regolith or rugged terrains. The proposed design's ability to store large amounts of elastic energy via actuation or impact absorption and to release it on command allows it to double as a lander and could be used for jumping over obstacles. This proposal would fund the construction and mechanical testing of a physical prototype meant to validate some of these concepts already demonstrated in simulation.