Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Legged-locomotion on inclined granular media JENNIFER RIESER, FEIFEI QIAN, DANIEL GOLDMAN, Georgia Institute of Technology — Animals traverse a wide variety of complex environments, including situations in which the ground beneath them can yield (e.g. dry granular media in desert dunes). Locomotion strategies that are effective on level granular media can fail when traversing a granular slope. Taking inspiration from successful legged-locomotors in sandy, uneven settings, we explore the ability of a small (15 cm long, 100 g), six-c-shaped legged robot to run uphill in a bed of 1-mm-diameter poppy seeds, using an alternating tripod gait. Our fully automated experiments reveal that locomotor performance can depend sensitively on both environmental parameters such as the inclination angle and volume fraction of the substrate, and robot morphology and control parameters like leg shape, step frequency, and the friction between the feet of the robot and the substrate. We assess performance by measuring the average speed of the robot, and we find that the robot tends to perform better at higher step frequency and lower inclination angles, and that average speed decreases more rapidly with increasing angle for higher step frequency.

Jennifer Rieser
Georgia Institute of Technology

Date submitted: 06 Nov 2015 Electronic form version 1.4