

Abstract Submitted
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Photoelastic gelatin spheres for investigation of locomotion in granular media SEYED AMIR MIRBAGHERI, ERICSON CENICEROS, MEHDI JABBARZADEH, ZEPHYR MCCORMICK, HENRY FU, University of Nevada, Reno — We describe a force measurement method in granular media which uses highly-sensitive photoelastic gelatin spheres and its application to measuring forces exerted as animals burrow through granular media. The method is applicable to both freshwater and marine organisms. We fabricate sensitively photoelastic gelatin spheres and describe a calibration method which relates forces applied to gelatin spheres with photoelastic signal. We show that photoelastic gelatin spheres can detect forces as small as 1 microNewton, and quantitatively measure forces with up to 60 microNewton precision, a two order of magnitude improvement compared to methods using plastic disks. Gelatin spheres can be fabricated with a range of sizes to investigate a variety of granular media. Finally, we used the calibrated gelatin spheres in a proof-of-principle experiment to measure forces during earthworm locomotion.

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