

Abstract Submitted  
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**Undulatory and peristaltic motion of California blackworms in water saturated sediments**<sup>1</sup> ARSHAD KUDROLLI, BRIAN CHANG, Clark University — The physical mechanisms by which organisms burrow in the loose sedimented Benthic layer at the bottom of lakes and oceans are not understood because of the difficulty in observing their motion in the opaque subsurface. We show that the California blackworms and earthworms use a combination of transverse undulatory strokes, and elongation-contraction peristaltic strokes, in water-saturated sediment beds. Using transparent granular hydrogels which refractive index-match with water, we dynamically track the shape of the worm, and its head and tail in real time inside the medium [1]. We show that the worm in fact moves faster in the sediments compared to moving in water exploiting the greater drag and drag anisotropy it experiences in the sediments compared with water while performing similar body motions. We also discuss the probing head motion of the worm as it makes decisions on the direction of motion and its impact on observed speed. [1]: "Burrowing dynamics of aquatic worms in soft sediments," Arshad Kudrolli and Bernny Ramirez, PNAS 116 25569-25574 (2019).

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