Abstract Submitted
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Drag reduction mechanisms employed by burrowing razor clams (Ensis directus) AMOS WINTER, ANETTE HOSOI, Hatsopoulos Microfluids Laboratory, MIT — In this work we describe how razor clams use localized fluidization to reduce drag and efficiently burrow through a granular substrate. Razor clams require nearly two orders of magnitude less force to move through sand than a blunt body of the same size and shape. By visualizing substrate deformation during burrowing, we investigate the clamshell kinematics which fluidize a small pocket of substrate around the body of the organism. Through experimentation and scaling arguments, we show that moving through a fluidized substrate rather than a packed granular medium dramatically reduces the drag force on the clam's body to a point within the animal's strength capabilities.

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