

Abstract Submitted  
for the DFD17 Meeting of  
The American Physical Society

**The Unique Propulsive Wake Pattern of the Swimming Sea Slug *Aplysia***<sup>1</sup> ZHUOYU ZHOU, RAJAT MITTAL, Johns Hopkins Univ — The *Aplysia*, also sometimes referred to as the ‘Sea Hare,’ is a sea slug that swims elegantly using large-amplitude flapping of its mantle. The Sea Hare has become a very valuable laboratory animal for investigation into nervous systems and brain behavior due to its simple neural system with large neurons and axons. Recently, attempts have also been made to develop biohybrid robots with both organic actuation and organic motor-pattern control inspired by the locomotion of *Aplysia*. While extensive works have been done to investigate this animal’s neurobiology, relatively little is known about its propulsive mechanisms and swimming energetics. In this study, incompressible flow simulations with a simple kinematical model are used to gain insights into vortex dynamics, thrust generation and energetics of locomotion. The effect of mantle kinematics on the propulsive performance is examined, and simulations indicate a unique vortex wake pattern that is responsible for thrust generation.

<sup>1</sup>The research is supported by NSF Grant PLR-1246317 and NSF XSEDE Grant TG-CTS100002.

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Date submitted: 09 Aug 2017

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