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**Fluid Dynamics of Underwater Flight in Sea Butterflies: Insights from Computational Modeling**[1] ZHUOYU ZHOU, RAJAT MITTAL, Johns Hopkins University, JEANNETTE YEN, DONALD WEBSTER, Georgia Institute of Technology — Sea butterflies such as Limacine helicina swim by flapping their wing-like parapodia, in a stroke that exhibits a clap-and-fling type kinematics as well as a strong interaction between the parapodia and the body of the animal at the end of downstroke. We used numerical simulations based on videogrammetric data to examine the fluid dynamics and force generation associated with this swimming motion. The unsteady lift-generating mechanism of clap-and-fling results in a sawtooth trajectory with a characteristic "wobble" in pitch. We employ coupled flow-body-dynamics simulations to model the free-swimming motion of the organism and explore the efficiency of propulsion as well the factors such as shell weight, that affect its sawtooth swimming trajectory.

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