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Swimming of a Sea Butterfly with an Elongated Shell FERHAT KARAKAS, University of South Florida, AMY E. MAAS, Bermuda Institute of Ocean Sciences, DAVID W. MURPHY, University of South Florida — Sea butterflies (pteropods) are small, zooplanktonic marine snails which swim by flapping highly flexible parapodia. Previous studies show that the swimming hydrodynamics of *Limacina helicina*, a polar pteropod with a spiraled shell, is similar to tiny insect flight aerodynamics and that forward-backward pitching is key for lift generation. However, swimming by diverse pteropod species with different shell shapes has not been examined. We present measurements of the swimming of *Cuvierina columnella*, a warm water species with an elongated non-spiraled shell collected off the coast of Bermuda. With a body length of 9 mm, wing beat frequency of 4-6 Hz and swimming speed of 35 mm/s, these organisms swim at a Reynolds number of approximately 300, larger than that of *L. helicina*. High speed 3D kinematics acquired via two orthogonal cameras reveals that the elongated shell correlates with reduced body pitching and that the wings bend approximately 180 degrees in each direction, overlapping at the end of each half-stroke. Time resolved 2D flow measurements collected with a micro-PIV system reveal leading edge vortices present in both power and recovery strokes. Interactions between the overlapping wings and the shell also likely play a role in lift generation.

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