

Abstract Submitted
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Fluid dynamics of forward swimming and turning for jellyfish

LAURA MILLER, University of North Carolina — Jellyfish propel themselves through the water through periodic contractions of their elastic bells. Some jellyfish, such as the box jellyfish *Tripedalia cystophora* and the upside down jellyfish *Cassiopea xamachana*, can perform turns via asymmetric contractions of the bell and by generating asymmetries in the outflow opening of the bell. The fluid dynamics of jellyfish forward propulsion and turning is explored here using the immersed boundary method. The 2D and 3D Navier-Stokes equations are coupled to the motion of a simplified jellyfish represented by an elastic boundary. An adaptive and parallelized version of the immersed boundary method (IBAMR) is used to resolve the detailed structure of the vortex wake. The asymmetric contraction and structure of the jellyfish generates asymmetries in the starting and stopping vortices. This creates a diagonal jet and a net torque acting on the jellyfish.

Laura Miller
University of North Carolina

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