

Abstract Submitted
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Propulsive performance of oscillating batoid-inspired fins DANIEL QUINN, University of Virginia, DAPHNE REIN-WESTON, PETER DEWEY, MELISSA GREEN, ALEXANDER SMITS, Princeton University — Thrust producing ray-like pectoral fins were actuated to drive a low friction carriage through a stationary tow tank. A DC servo motor powered a gear train that produced a traveling wave motion along the chord of the fin. The amplitude of the traveling wave increased linearly along the span from root to tip. A digital optical encoder attached to the carriage tracked the position and velocity as it was propelled through the water by the oscillating fin. Velocity profiles were acquired from trials using different planforms inspired by members of the eagle ray family, as well as an idealized elliptical fin. Traveling wave frequency and wavelength were varied to investigate the propulsive performance of different gaits. Preliminary flow visualization was also performed to describe the structure of the wakes generated by the various planform geometries and locomotory gaits.

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