

Abstract Submitted
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Bio-inspired propulsor using internally powered flexible fins PETER YEH, ALPER ERTURK, ALEXANDER ALEXEEV, Georgia Institute of Technology — Using experiments and three dimensional numerical simulations, we study the underwater locomotion of internally powered flexible plates. The flexible plate is composed of Macro-Fiber Composite (MFC) piezoelectric laminates. A sinusoidally varying voltage is applied to the MFCs, causing bending and generating thrust similar to a flapping fin in carangiform motion. In our fully coupled FSI simulations, we model the swimmer as a rectangular elastic plate actuated by a sinusoidal internal moment. The steady state swimming velocity and thrust are measured experimentally and compared to our numerical simulations. Our results can be used to design underwater self-propelling vehicles driven by internally powered flexible fins.

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