Autonomous underwater vehicles (AUV’s) are becoming increasingly important in the roles of ocean sampling and surveillance, and great potential exists for their use in a variety of other applications. Their effectiveness could be enhanced through improvements in efficiency, stealth, and maneuverability, which we may realize by imitating the swimming characteristics of aquatic animals. This seminar explores the physics of thrust production through experimental investigation of the thrust performance and wake structure produced by a simple propulsor consisting of a rigid rectangular pitching panel. In particular, the characteristics of low-aspect-ratio panels will be discussed, which bear a resemblance to many types of biological fins. The parameters governing thrust performance will be investigated and a comprehensive vortex skeleton wake model will be presented. In spite of the disparate wake patterns observed with variation in forcing parameters, it is shown that each of these patterns is described by a single wake topology, which is consistent with structures observed in a wide variety of unsteady flows.

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