

Abstract Submitted
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A Study of a Mechanical Swimming Lamprey MEGAN LEFTWICH, MARCUS HULTMARK, ALEXANDER SMITS, Princeton University — In order to develop a comprehensive model of lamprey locomotion, we use a swimming robotic lamprey as a means of investigating the surface pressure, thrust and wake structure. A programmable microcomputer actuates 13 servomotors that produce a traveling wave along the length of the lamprey's body. This waveform is based on the motion of the American eel (*Anguilla rostrata*), as described by Tytell and Lauder (2004). Dye flow visualization and particle image velocimetry (PIV) are used to study the wake structure generated by the robot and the flowfield along the body. These visualization methods show that two distinct, oppositely signed vortices are shed each half cycle; whereas along the body, no large scale vortical shedding can be observed, suggesting that most of the thrust is produced by the tail. Thrust data based on momentum balances support this suggestion. The project is supported by NIH Grant 1RO1NS054271.

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