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An integrative CFD model of lamprey swimming CHIA-YU HSU, Tulane University, TYLER MCMILLEN, California State University at Fullerton, LISA FAUCI, Tulane University — Swimming due to sinusoidal body undulations is observed across the full spectrum of swimming organisms, from microscopic flagella to fish. These undulations are achieved due to internal force-generating mechanisms, which, in the case of lamprey are due to a wave of neural activation from head to tail which gives rise to a wave of muscle activation. These active forces are also mediated by passive structural forces. Here we present recent results on a computational model of a swimming lamprey that couples activation of discrete muscle segments, passive elastic forces, and a surrounding viscous, incompressible fluid. The fluid dynamics is modeled by the Navier-Stokes equations at appropriate Reynolds numbers, where the resulting flow field and vortex shedding may be measured.

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