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A model of a flexible anguilliform swimmer driven by a central pattern generator with proprioceptive feedback CHRISTINA HAMLET, Tulane University, ERIC TYTELL, Tufts University, KATHLEEN HOFFMAN, University of Maryland, Baltimore County, LISA FAUCI, Tulane University — The swimming of a simple vertebrate, the lamprey, can shed light on how a flexible body can couple with a fluid environment to swim rapidly and efficiently. Animals use proprioceptive sensory information to sense how their bodies are bending, and then adjust the neural signals to their muscles to improve performance. We will present recent progress in the development of a computational model of a lamprey swimming in a Navier-Stokes fluid where a simple central pattern generator model, based on phase oscillators, is coupled to the evolving body dynamics of the swimmer through curvature and curvature derivative feedback. Such feedback can be positive (frequency decreasing), negative (frequency increasing), or mixed (positive to one side of the body and negative to the other, or vice versa). We will examine how the emergent swimming behavior and cost of transport depends upon these functional forms of proprioceptive feedback chosen in the model.

Lisa Fauci
Tulane University

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