1135-VF-1720 **Alexander P Hoover*** (hoover.alexander@gmail.com), 116 N Murat St, Apt B, New Orleans, LA 70119, and **Ricardo Cortez**, **Eric Tytell** and **Lisa Fauci**. *Heave and Flow: Understanding the role of resonance and shape evolution for heaving flexible panels.*

Many animals that swim or fly use their body to accelerate the fluid around them, transferring momentum from their bodies to the surrounding fluid. The emergent kinematics from this transfer are a result of the coupling between the fluid and the material properties of the body. Here we present a computational study of a 3-dimensional flexible panel that is heaved at its leading edge in an incompressible, viscous fluid. These high-fidelity numerical simulations enable us to examine the role of resonance, fluid forces, and panel deformations have on swimming performance. Varying both the passive material properties and the heaving frequency of the panel, we find peaks in trailing edge amplitude and forward swimming speed are determined by a dimensionless quantity, the effective flexibility. Modal decompositions of panel deflections reveal that the strength of each mode is related to the effective flexibility and peaks in the swimming speed and trailing edge amplitude correspond to peaks in the contributions of different modes. Panels of different material properties but with similar effective flexibilities have modal contributions that evolve similarly over the phase of the heaving cycle and agreement in dominant vortex structures generated by the panel. (Received September 24, 2017)