Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Dynamics of pulsing soft corals[1] GABRIELLE HOBSON, LAURA MILLER, University of North Carolina at Chapel Hill, SHILPA KHATRI, University of California, Merced — Soft corals of the family Xeniidae have a pulsing motion that generates flow in their surrounding fluid. This flow brings new samples of fluid towards the coral, allows sufficiently slow mixing for removal of photosynthetic waste to occur, and then transports the fluid away from the polyp to reduce resampling (Samson et al. 2019). Generating this flow allows the pulsating corals to perform photosynthesis at much higher rates than non-pulsating soft corals (Kremien et al. 2013). Numerical simulations of the pulsations of the coral were conducted using the immersed boundary method. By quantifying flow characteristics such as velocity, vorticity, and Lagrangian coherent structures, we investigated how the flow changed as we varied the frequency-based Reynolds number and the length of the resting period between pulses. Further investigations into the efficiency of fluid transport by the polyps will also be presented. Key words: Immersed boundary method, pulsing soft corals, computational fluid dynamics, biomechanics

[1]Funding: NSF PHY grant #1505061

Gabrielle Hobson
University of North Carolina at Chapel Hill

Date submitted: 02 Aug 2019 Electronic form version 1.4