Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Effects of coral colony morphology on local turbulent flow dynamics MD MONIR HOSSAIN, ANNE STAPLES, Virginia Tech — Coral reefs rely on the local flow field to carry out physiological processes like respiration and nutrient uptake. Despite the importance of corals and the pervasive threats facing them, characterizing the local hydrodynamics between their branches has remained a significant challenge. Here, we investigate the effects of colony branch density and surface roughness on the flow field using three-dimensional immersed boundary, large-eddy simulations for four different colony geometries under unidirectional oncoming flow conditions. We compare loosely and densely branched *Pocillapora* colonies, and *Monitipora* colonies with and without roughness elements called verrucae. In the *Pocillopora* colonies, we found that the mean velocity profiles changed substantially in the center of the dense colony, becoming reduced at middle heights where flow penetration was poor, while the profiles in the loosely branched colony remained similar throughout the colony. In the *Montipora* colonies, counterintuitively, the colony without verrucae produced almost double the maximum Reynolds stress magnitude above the colony compared to the colony with verrucae. This implies that the smooth colony will have comparatively higher mass transport, bed shear stress, and friction velocity values.

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Date submitted: 10 Aug 2020 Electronic form version 1.4