Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Pore Water Pumping by Upside-Down Jellyfish MANIKANTAM GADDAM, ARVIND SANTHANAKRISHNAN, Oklahoma State University — Patchy aggregations of Cassiopea medusae, commonly called upside-down jellyfish, are found in sheltered marine environments with low-speed ambient flows. These medusae exhibit a sessile, non-swimming lifestyle, and are oriented such that their bells are attached to the substrate and oral arms point towards sunlight. Pulsations of their bells are used to generate currents for suspension feeding. Their pulsations have also been proposed to generate forces that can release sediment locked nutrients into the surrounding water. The goal of this study is to examine pore water pumping by Cassiopea individuals in laboratory aquaria, as a model for understanding pore water pumping in unsteady flows. Planar laser-induced fluorescence (PLIF) measurements were conducted to visualize the release of pore water via bell motion, using fluorescent dye introduced underneath the substrate. 2D particle image velocimetry (PIV) measurements were conducted on the same individuals to correlate PLIF-based concentration profiles with the jets generated by pulsing of medusae. The effects of varying bell diameter on pore water release and pumping currents will be discussed.

Manikantam Gaddam
Oklahoma State University

Date submitted: 01 Aug 2016 Electronic form version 1.4