Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Hydrodynamic Interaction of Pitching Hydrofoils in Close Formation[1] MICHAEL BOLTRI, OSCAR CURET, Florida Atlantic University — Swimming in close formation has the potential to improve swimming performance including swimming speed or power consumption. Numerical and physical models have shown that swimmers can take advantage of vortex shedding from other swimmers. However, most of the experimental work has been limited to few swimmers and tend to focus on the hydrodynamic interaction within the school. In this work, we developed an array of nine pitching hydrofoils (NACA0025) in close formation to examine the hydrodynamic interaction within the group and the wake generated by the group of foils. The pitching foils were tested in an inclined soap film to capture the flow structures generated by the foils. The foils were pitched at the quarter-chord with either sinusoidal or triangular wave patterns. The foils were tested with different frequency, amplitude, phase difference and spacing between them. We were able to capture the hydrodynamic interaction and the flow structure generated by the group. It appears that the flow structure generated by the group of foils is the result of a recombination of the vortex structures generated by the individual foils.

[1]This material is based upon work supported by the National Science Foundation under Grant No 1751548

Michael Boltri
Florida Atlantic University

Date submitted: 01 Aug 2019 Electronic form version 1.4