Flow structures in the wake of heaving and pitching foils
DEREK NAJDZIN, ENRIQUE PARDO, MEGAN C. LEFTWICH, PHILIPPE M. BARDET, The George Washington University — A 10-bar mechanism drives a cambering hydrofoil in an oscillatory heaving and pitching motion that replicates the flapping motion of a dolphin tail. The mechanism sits on a force-balance with six strain gages that together measure the forces and moments experienced by the fin during an oscillation. Planar Laser-Induced Fluorescence is used to image the flow structures created downstream of the cambering fin for a range of Reynolds and Strouhal numbers. The images are taken in the mid-plane, parallel to the bottom of the water tunnel. These results are compared to a rigid foil at matching conditions to investigate the role of camber changes during the flapping cycle.