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The effect of butterfly-scale inspired patterning on leading-edge vortex growth[1] JACOB WILROY, AMY LANG, Univ of Alabama - Tuscaloosa — Leading edge vortices (LEVs) are important for generating thrust and lift in flapping flight, and the surface patterning (scales) on butterfly wings is hypothesized to play a role in the vortex formation of the LEV. To simplify this complex flow problem, an experiment was designed to focus on the alteration of 2-D vortex development with a variation in surface patterning. Specifically, the secondary vorticity generated by the LEV interacting at the patterned surface was studied and the subsequent affect on the growth rate of the circulation in the LEV. For this experiment we used butterfly inspired grooves attached to a flat plate and compared the vortex formation to a smooth plate case as the plate moved vertically. The plate is impulsively started in quiescent water and flow fields at Re = 1500, 3000, and 6000 are examined using Digital Particle Image Velocimetry (DPIV). The vortex formation time is 3.0 and is based on the flat plate travel length and chord length.

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