

Abstract Submitted
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The effect of butterfly-scale inspired patterning on leading-edge vortex growth¹ JACOB WILROY, AMY LANG, University of Alabama, REDHA WAHIDI, None — 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, we designed an experiment to focus on the alteration of 2-D vortex development with a variation in surface patterning. Specifically we are interested in the secondary vorticity generated by the LEV interacting at the patterned surface and how this can affect the growth rate of the circulation in the LEV. For this experiment we used rapid-prototyped longitudinal and transverse square grooves attached to a flat plate and compared the vortex formation 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 0.6 and is based on the flat plate travel length and chord length.

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