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Experimental study on the effects of trailing edge geometry on the propulsive performance and wake structure of bio-inspired pitching panels[1] JUSTIN KING, MELISSA GREEN, Syracuse Univ — Force measurements and stereoscopic particle image velocimetry (SPIV) were used to characterize the propulsive performance and three-dimensional wake structure of rigid, acrylic pitching panels with various trailing edge geometries. Experiments were carried out on multiple panels with bio-inspired planforms that were pitched about their leading edge. A trapezoidal panel geometry with a straight trailing edge was chosen as a baseline case, and deviations from a trapezoid were studied using panels with either a concave or convex trailing edge Previous work by van Buren *et al.* (Physical Review Fluids, 2017) has established that parameters such as coefficient of thrust and propulsive efficiency can be affected by changes in the trailing edge shape of pitching panels. In the current work, SPIV data were collected across the spanwise extent of the wake, and it is demonstrated that spanwise vortices are organized to form a reverse von Karman vortex street across much of the spanwise extent of the wake. The spanwise vortices are oriented in accordance with the trailing edge shape, i.e. a concave trailing edge sheds spanwise vortices that are bent inwards while a convex trailing edge sheds spanwise vortices that are bent outwards. The SPIV results also provide further insight into the three-dimensional wake behavior and structure as it relates to propulsive performance.

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