

Abstract Submitted  
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**LCS analysis of a biologically inspired wake**<sup>1</sup> MELISSA GREEN,  
ALEXANDER SMITS, Princeton University — Particle Image Velocimetry (PIV)  
was used to investigate the wakes of rigid pitching panels with a trapezoidal panel  
geometry, chosen to model idealized fish caudal fins. Experiments were performed  
for Strouhal numbers from 0.23 to 0.65. The three dimensional flow field around the  
panel is reconstructed by integrating two-dimensional PIV results across the volume  
surrounding the panel. A Lagrangian coherent structure (LCS) analysis is employed  
to investigate the formation and evolution of the panel wake. A classic reverse von  
Kármán vortex street pattern was observed along the mid-span of the near wake,  
but the complexity and three-dimensionality of the wake increases away from the  
mid-span as streamwise vortices interact with the swept edges of the panel.

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Melissa Green  
Princeton University

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