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Lagrangian Coherent Structures in Vortex Shedding Behind a Two Dimensional Airfoil BLAKE CARDWELL, KAMRAN MOHSENI, University of Colorado — The processes of turbulent mixing and vortex shedding in the wake region of airfoils greatly influence the dynamics and performance of many engineering devices, including airplanes and turbines. Understanding these processes is the key to improving device performance and efficiency. Lagrangian Coherent Structures (LCS) are employed in this study in order to predict and control the wake structure and vortex shedding over an airfoil. Lagrangian Coherent Structures provide insight into the location and behavior of separation points, fluid transport mechanisms, and are responsible for fluid mixing. This presentation will cover the fundamentals of Lagrangian Coherent Structures and how they have been applied to vortex shedding behind a 2D airfoil. Detailed animations of LCS behavior will be provided, including the movement of passive fluid tracers to illustrate the effect of LCS on fluid mixing. Additionally, a discussion of the physical behavior of these structures, and potential application for flow control will be presented.

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