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**Manipulation of Laminar Separation Utilizing Dynamic Roughness at the Leading Edge of an Idealized Airfoil** RYAN WALLACE, BEVERLEY MCKEON, California Institute of Technology — Low Reynolds number flow over a symmetric, idealized airfoil with a reasonably constant laminar separation point was manipulated using a leading edge roughness element with small, time-dependent amplitude. At a fixed height and low Reynolds number the roughness element was able to reduce the extent of laminar separation over the airfoil as compared to a smooth airfoil. Further reduction of the separation was achieved by dynamically oscillating the roughness element in an appropriate range of actuation frequencies. Proper orthogonal decomposition performed upon the flow over the airfoil for both the baseline and active open loop case shows the introduction of persistent structures within the flow due to the oscillating roughness element. The coupling of this small input perturbation with the flow and the resultant manipulation of the separation bubble will be discussed for a range of flow and roughness conditions. The support of NSF CAREER award #0747672 is gratefully acknowledged.

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