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Passive Flap Actuation by Reversing Flow in Laminar Boundary Layer Separation[1] CHASE PARSONS, AMY LANG, LEO SANTOS, ANDREW BONACCI, University of Alabama — Reducing the flow separation is of great interest in the field of fluid mechanics in order to reduce drag and improve the overall efficiency of aircraft. This project seeks to investigate passive flow control using shark inspired microflaps in laminar boundary layer separation. This study aims to show that whether a flow is laminar or turbulent, laminar and 2D or turbulent and 3D, microflaps actuated by reversing flow is a robust means of controlling flow separation. In order to generate a controlled adverse pressure gradient, a rotating cylinder induces separation at a chosen location on a flat plate boundary layer with Re above 10000. Within this thick boundary layer, digital particle image velocimetry is used to map the flow. This research can be used in the future to better understand the nature of the bristling shark scales and its ability to passively control separation. Results show that microflaps successfully actuated due to backflow and that this altered the formation of flow separation.

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