Abstract Submitted
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**Passive Actuation of Scales Modeled after Shark Scales to Delay Separation in a Steady Turbulent Boundary Layer**[1] CHASE PARSONS, AMY LANG, LEONARDO SANTOS, ANDREW BONACCI, SARAH FOLEY, The University of Alabama — Delaying the onset of flow separation is of great interest in the field of fluid mechanics to improve the overall aerodynamic efficiency of aircraft. This project seeks to investigate passive flow control using shortfin mako shark inspired manufactured scales in turbulent boundary layer separation. Previous studies have demonstrated the effectiveness of similar devices placed inside the separation bubble. In this study, the scales are placed in front of the separation point to investigate the effectiveness to delay separation. Reversing flow is the primary mechanism causing the actuation of the shark scales, so under these test conditions, it is hypothesized that reversing flow low speed streaks can actuate and be controlled by the scales, thus delaying the onset of separation. To generate a controlled adverse pressure gradient, a rotating cylinder induces separation at a chosen location within a flat plate turbulent boundary layer ranging from Re=495,000 to Re=710,000. With this thick boundary layer, DPIV is used to measure the flow characteristics. The goal is to better understand the fundamental mechanisms by which shark scales can induce passive flow control with the aim of fabricating surfaces suitable for real aircraft applications.

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