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Experimental Study of Unsteady Separation in a Laminar Boundary Layer[1] ANDREW BONACCI, AMY LANG, REDHA WAHIDI, LEO SANTOS, The University of Alabama — Separation, caused by an adverse pressure gradient, can be a major problem to aircraft. Reversing flow occurs in separated regions and an investigation of how this backflow forms is of interest due to the fact that this could be used as a means of initiating flow control. Specifically, backflow can bristle shark scales which may be linked to a passive, flow actuated separation control mechanism. An experiment was conducted in a water tunnel to replicate separation, with a focus on the reversing flow development near the wall within a laminar boundary layer. Using a rotating cylinder, an adverse pressure gradient was induced creating a separated region over a flat plate. In this experiment the boundary layer grows to sizes great enough that the scale of the flow is increased, making it more measurable to DPIV. In the future, this research can be utilized to better understand flow control mechanisms such as those enabled by shark skin.

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Amy Lang
The University of Alabama

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