



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

Name(s) Blake T. Scurry	Project Number J0121
Project Title A Unique Spin on Aerodynamics: Airfoil Augmented with Semi-Auto Rotating Leading Edge Cylinder	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Determine if an airfoil with a semi-auto rotating leading edge can efficiently increase lift by 25%.</p> <p>Methods/Materials A low speed wind tunnel built of cardboard, wood, Plexiglas, and portable fan for wind generation. An apparatus was created to hold a rotating cylinder and airfoil suspended on a scale. The cylinders and airfoils are made from 3D printing. The data was collected utilizing weight, RPM, and wind speed measurements. Dry ice was used for flow visualization.</p> <p>Results The data from multiple test runs of both a stand-alone cylinder and an airfoil augmented with a leading-edge rotating cylinder resulted in a 7% increase in lift.</p> <p>Conclusions/Discussion The test results of 7% increase in lift varied from the predicted 25% increase in lift by approximately 70%. This discrepancy is primarily related to the inability to meet target RPM speeds due to instability.</p>	
Summary Statement The addition of a semi auto-rotating leading-edge cylinder to an airfoil does increase lift.	
Help Received Help was received from a neighbor who is an aerospace engineer as well as from my father in correcting my airfoil assembly when excess vibration occurred.	