



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

Name(s) Blake T. Scurry	Project Number 38259
Project Title A Unique Spin on Aerodynamics: Airfoil Augmented with Semi-Auto Rotating Leading Edge Cylinder	
Abstract Objectives/Goals Determine if an airfoil with a semi-auto rotating leading edge can efficiently increase lift by 25%. 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. 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. 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.	
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.	