



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

<b>Name(s)</b> <b>Callie M. McCaffery</b>	<b>Project Number</b> <b>S0321</b>
<b>Project Title</b> <b>Birds, Planes, and Winglets</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Does adding winglets to the ends of wind turbine blades affect the wind turbine's performance compared to a wind turbine with blades that have no winglets? <b>Methods/Materials</b> I designed and built my own wind turbine and wind tunnel that would allow for testing of different blade configurations. Data was gathered by counting rotations per minute. <b>Results</b> I found that winglets do affect wind turbine performance. I ran three different tests, making changes to each wind turbine blade design that focused on eliminating extra variables, such as center of gravity differences. After completing the testing analysis, I ran a fourth test that demonstrated some clear benefits to winglets. <b>Conclusions/Discussion</b> I found results that supported both advantages and disadvantages to winglets on wind turbine blades. Blade design appears to be a critical factor, and based on my results, I believe that continued testing in this area would be appropriate. Just as winglets on airplane wings have increased efficiency, saving millions of dollars, I believe that improved wind turbine blade design could increase wind turbine efficiency as well.	
<b>Summary Statement</b> Adding winglets to the blades of a wind turbine affects the performance of the wind turbine.	
<b>Help Received</b> My engineering teacher reviewed my theories and sketches. My science teacher and mentor assisted with review of materials and project concept. My parents assisted with some material construction, and data recording.	