



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> Spencer M. Cheleden	<b>Project Number</b> <b>S1702</b>
<b>Project Title</b> <b>Evaluation of Silver Based Astronomical Telescope Coatings</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This project attempts to construct a multilayered coating, consisting of silver and other materials, for use in a telescope. The goals of this design are to maximize reflectivity of the telescope and to have a highly durable coating.</p> <p><b>Methods/Materials</b> The coating lab at UCO Lick, University of California, Santa Cruz was the primary lab for this project. Various oxides, fluorides and nitrides, silver and aluminum were used for the coatings. Construct various combinations of these materials on top of silver and measure their optical and physical properties.</p> <p><b>Results</b> The twenty materials originally selected were narrowed down to four for a final shortlist. These materials performed the best optically (when their reflectivity was tested) and physically (when subject to environmental stress).</p> <p><b>Conclusions/Discussion</b> These results will be used in an upcoming paper about implementation of the coatings. This project gave the other researchers a material library from which to work.</p>	
<b>Summary Statement</b> This project catalogues materials for use in astronomical coatings for use in reflector telescopes and their efficacy when combined with silver.	
<b>Help Received</b> Dr. Andrew C. Phillips of UCO Lick Observatories at the University of California, Santa Cruz provided the initial idea for this project. Mr. Brian Dupraw trained me to use the Coatings Lab at UCSC. I performed the sample production with Mr. Dupraw assistance and took all measurements by myself.	