



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

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<b>Project Title</b> <b>Systematic Analysis of Solar Activity and Developing Predictive Indicators Pertaining to Solar Storms Using a MATLAB Code</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The main objective of our project is to create a tool using MATLAB that will automatically analyze pictures of the Sun right before a solar storm occurred. <b>Methods/Materials</b> We used data captured by satellites from the Solar Dynamics Observatory, which is a NASA mission that was launched in 2010, and the Joint Science Operations Center database from Stanford. Our methodology was creating an image-processing code using MATLAB to analyze images of the sun 30 days prior at 12 hour intervals before a solar flare or coronal mass ejection occurred. We calculated the total area of sunspots which we correlated with solar activity. <b>Results</b> Our results indicate that the solar activity, which represents irregularities in the magnetic field on the surface of the sun, increased before solar storms happened. <b>Conclusions/Discussion</b> We learned that before a solar storm occurs, solar activity in the form of sunspot area increased. Therefore, we can use this as a predictive indicator that allows us to predict future solar storms.	
<b>Summary Statement</b> We created a MATLAB code that calculates the total area of sunspots on pictures of the sun and learned that the area of sunspots increased before a solar storm occurred.	
<b>Help Received</b> We got the idea to use the JSOC database and SDO satellite images from our project advisor.	