



# CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

<b>Name(s)</b> <b>Natalie C. White</b>	<b>Project Number</b> <b>J0812</b>
<b>Project Title</b> <b>Measurement of Cosmic Rays in the Earth's Stratosphere</b>	
<b>Objectives/Goals</b> The primary objective was to determine if the number of cosmic rays changes with altitude. The secondary objective was to obtain temperature, other flight data, and video.	
<b>Abstract</b> <b>Methods/Materials</b> This project is a continuation from last year. So far, I have made three weather balloon flights. The Falcon I recorded data to only 56,000 feet when the flight computer stopped working. The Falcon II was lost when my GPS transmitter stopped sending signals near Mt Whitney. It was found in Texas several months later and returned to me. Unfortunately, it had very little data since the flight computer stopped working shortly into the flight. At this point, I decided to concentrate on ground testing my equipment before any more flights. I found that my flight computer could stop taking data at random times even when it had a good battery. I decided to use an Arduino mini-computer to monitor my flight computer and to reset it when necessary. I also needed a better way to track my balloon. I found that an APRS (Automatic Packet Reporting System) radio would be a big improvement over my SPOT GPS transmitter. However, to use an APRS radio I needed to obtain my Technician level amateur license. In February 2015, I passed the exam and received my call sign: KK6SDN. The Falcon III was launched on March 8, 2015 and reached an altitude of 86,000 feet. Both the flight computer and APRS radio on the Falcon III worked perfectly.	
<b>Results</b> The radiation count is low and constant below 10,000 feet. Between 20,000 feet and 50,000 feet the count rises rapidly as the altitude increases. Finally, above 50,000 feet the radiation count levels out. Above 60,000 feet the counts decrease gradually. In addition, three cameras obtained a total of nearly three hours of movies at altitudes up to 44,000 ft.	
<b>Conclusions/Discussion</b> The radiation count increases with altitude but then decreases. I would like to launch another balloon to obtain data in the region from 86,000 to 110,000 feet. I would like to determine if the count levels out at higher altitude. Also, I would like to improve the reliability of my cameras and obtain video of the entire flight, from launch to landing.	
<b>Summary Statement</b> I measured how the cosmic rays count changes with altitude using a Geiger counter on a weather balloon.	
<b>Help Received</b> My father taught me how to solder and use a multimeter. Simon Gonzales helped to find my equipment after it landed.	