# CALIFORNIA STATE SCIENCE FAIR
## 2014 PROJECT SUMMARY

**Name(s)**
David Zhang

**Project Number**
**J0235**

**Project Title**
# Optimizing Solar Panel Efficiency: Comparing Energy Efficiency of a Solar Tracker and Stationary Solar Panels

**Abstract**

**Objectives/Goals**
The objective of my project is to determine if a solar tracker that is designed to rotate the solar panel throughout the day to follow the sun will generate more energy than the stationary solar panel system.

**Methods/Materials**
Two types of solar panel systems were built in this experiment: a solar tracker that used a light sensor and a DC motor to rotate the solar panel to track the sun, and a stationary solar panel built with a solar panel identical to the one used in the solar tracker. There are three testing units for the stationary solar panel systems by changing the direction of the solar panel: a stationary solar panel facing the east (Stationary East), a stationary solar panel facing the west (Stationary West), and a stationary solar panel laying flat on the ground (Stationary Flat). Seven days of data was recorded for the four testing units. Each day, twelve data points were recorded from 7:30 am to 6:30 pm by one hour intervals to record the power output of each testing unit. The final analysis only used five days of data by taking out the largest and smallest days in terms of average daily power output.

**Results**
The Solar Tracker consistently generated higher power output than all the other stationary testing units because it always had a direct beam of sunlight hitting it to produce the optimal power output of the solar panel. The Stationary Flat produced more power than the other two stationary units because it always had a beam of sunlight hitting it through the day although it is not at an optimal angle. The Stationary East and Stationary West generated similar level of daily power output, and the only difference is one generated power in the morning and the other one generated power in the afternoon.

**Conclusions/Discussion**
In conclusion, the angle of a beam of sunlight hitting the solar panel does affect the power output of the solar panel. Therefore, using a solar tracker will help to optimize the solar panel efficiency by generating more power.

**Summary Statement**
My project is about optimizing solar panel efficiency using a solar tracker.

**Help Received**
Participant in the Avid Academy Science Research Summer Camp; Mother helped check the format of my display board.