# CALIFORNIA STATE SCIENCE FAIR
# 2014 PROJECT SUMMARY

**Name(s)**

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**Project Number**

**S0910**

**Project Title**

## Blinded by the Night: Engineering Automatic Photo Protective Glasses

**Abstract**

**Objectives/Goals**

Night vision while driving can be impaired by bright lights from on coming car headlights causing a period of blindness until the eye recovers. We wanted to build photo-protective glasses to remove this period of light blindness.

**Methods/Materials**

In our experiment we used a set of LCD 3-D shutter glasses. In order to control the LCD screen on the glasses we use a micro-controller called an Arduino, which enabled us to program it using the C programming language. We used a light sensor to detect the changes in light. When the light was above a threshold value the glasses went dark. We tested the glasses on volunteers by asking them to identify the two letters on an eye chart after a one second pulse from some car headlights. We then repeated this with both the glasses turned off and on.

**Results**

Our prototype glasses were effective at removing the bright light from the car head lights hitting the retina. The period of visual blindness that normally occurs after a bright light was reduced using our photo protective glasses. We found that the average period of blindness was significantly reduced (5.7 seconds to 3.5 seconds) with glasses activated. The period of blindness was greater in people older than 40 compared to those younger than fifteen (6.3 vs 5.1 seconds) and was reduced to 3.7 secs regardless of age.

**Conclusions/Discussion**

We successfully built a prototype pair of photo protective glasses and demonstrated their effectiveness to reduce bright light-induced night blindness in people.

**Summary Statement**

Engineered photo protective glasses to prevent bright light-induced night blindness to enhance night time driving in older people.

**Help Received**