



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2018 PROJECT SUMMARY**

<b>Name(s)</b> <b>Lou Fowler</b>	<b>Project Number</b>  38213
<b>Project Title</b> <b>The Creation of a Hardy-Weinberg Calculator for Five Alleles Utilizing Python Coding Language</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this project is to create a pair of calculators for the Hardy-Weinberg equations using Python coding language.</p> <p><b>Methods/Materials</b> A computer and Python coding software were used in this project.</p> <p><b>Results</b> This project was successfully completed. The calculators developed in this project enable the user to calculate the genotype and allele frequencies in a population with up to five alleles. These are the only Hardy-Weinberg equations calculators that can calculate from genotype to allele frequency.</p> <p><b>Conclusions/Discussion</b> The goal of this project was to create a pair of calculators for the Hardy-Weinberg equations. The goal was achieved in this project. This project improves upon existing versions by allowing the user to calculate allele and genotype frequencies for a multi-allele gene. The Hardy-Weinberg equations are an inexpensive and noninvasive means of determining the frequency of a genetic disease in a given population. These calculators can also be used to easily calculate the frequency of other health-related genotypes. For example, the frequencies of blood types in a population can be found with these calculators. This is critical information for hospitals and blood banks. The function of these calculators is especially important with the growing understanding of the influence of genetics on health.</p>	
<b>Summary Statement</b> I created a pair of calculators for the Hardy-Weinberg equations that can calculate both allele and genotype frequency in a population using up to five alleles.	
<b>Help Received</b> I did internet research on Python coding. I based my work on previous work done on programming quadratic equations. I was mentored by Tyler Sutterley, a software engineer. I wrote my own code and did all of my work at school or at home.	