



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Harrison M. Ku	Project Number S0912
Project Title Using Mechanical Models to Determine the Maximum Amount of Energy Gathered from the Human Footstep	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project was to determine which types of electricity-generating mechanisms at which parts of the foot would generate the greatest amount of electricity. Three different positions were tested against three different locations to attempt to find the best possible combination.</p> <p>Methods/Materials For this project, a re-wired hand-crank flashlight was used as a generator. A large water bottle was also used as a mass, and a mass scale was used to calibrate that mass. A voltmeter was also utilized to measure the amount of electricity generated.</p> <p>Results Having a normal lever system at the heel strike, a pad-type mechanism at the ball strike, and an inverted lever system at the forefoot strike proved to be the combination that produced the most energy (electrical potential).</p> <p>Conclusions/Discussion Current technologies that utilize the forces of a footstep to generate electricity focus on the heel strike. In comparison, my experiment shows that more than three times as much electricity can be generated if forces from the entire footstep are captured with the correct mechanisms. Applications in this field are enormous: current technologies are shown to be able to charge an iPhone in only 6 hours, and my design only improves this process. Some research I hope to conduct in the future includes utilizing my model to build a completely functional prototype, or testing my model further using computer simulations.</p>	
Summary Statement My project experiments on the forces of a footstep to determine which footstep energy-harnessing design will produce the most electricity.	
Help Received Parents helped to buy materials.	