



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> Marco R. Evans	<b>Project Number</b>  36630
<b>Project Title</b> The Energy Shoe: Generating Electricity while You Walk	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The design goal was to make a Faraday generator that is attached to your shoe and could charge a 5V mobile device.</p> <p><b>Methods/Materials</b> The battery charger consisted of the Faraday generator and the charging circuit. Faraday generators were made by placing different sizes of cylindrical rare earth neodymium magnets in plastic tubes that were wrapped with copper magnet wire. The charging circuit consisted of diodes for the rectifier bridge, capacitors and various voltage regulators and rechargeable batteries.</p> <p><b>Results</b> My prototype design proved that I could measure voltage and charge a 1.5 volt battery. Larger magnets generated more voltage than smaller magnets, and shaking by hand generated 500mV per shake, but walking produced significantly less. In order to generate 5 volts, a booster voltage regulator was installed in the next circuit design and current was measured by placing different resistors in the circuit and measuring the change. The power output was calculated for each generator to determine which size was best for charging while walking.</p> <p><b>Conclusions/Discussion</b> I was able to make Faraday generators that can fit on your shoe, and charging circuits that can charge batteries. The final design must be a reasonable balance of size and power output.</p>	
<b>Summary Statement</b> Design a battery charger that is mounted on your shoe that will charge a 5V mobile device while you walk.	
<b>Help Received</b> James Evans helped with getting materials and building this project. The Santa Cruz County lead judges suggested improvements.	