



# CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

<b>Name(s)</b> <b>Lauren E. Henske</b>	<b>Project Number</b> <b>J0918</b>
<b>Project Title</b> <b>It's Raining Electricity: Generating Electricity from Water Using Kelvin Electrostatic Generator Principles</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of my "IT'S RAINING ELECTRICITY" project was to observe how water flow rate effects the generation of static charge in a Kelvin electrostatic generator. I predicted that as you speed up the water flow rate, the intervals between sparks produced by the generator would decrease because the copper coils would gather ions from the water at a faster rate. The experimental variable was the water drip rate. My goal was to make it work and learn more about static charge generation.</p> <p><b>Methods/Materials</b> To test this, it took three different design attempts before I could run trials that would reliably generate a spark, effectively monitor the drip rate as a variable, and accurately measure the time interval between sparks. My final (successful) apparatus used two petcocks, which restricted water flow and enabled accurate measurement of milliliters per minute, as well as a unique spark fixture that created "lightening." It also relied on water free-falling into a double helix of copper coils that descended into weighted metal canisters resting on insulated foam, with electrodes connected to the spark fixture. To run a trial, I poured water into the top, varied the drip rate, let the water move through the static charge collectors (coils, canisters, electrodes and spark fixture), and timed the interval between sparks.</p> <p><b>Results</b> My results indicated that when you increase the water drip rate in a Kelvin electrostatic generator, the interval of time between sparks decreases. I also learned that humidity is an important variable to control, and that there is an "art" to the science of building a reliable Kelvin electrostatic generator.</p> <p><b>Conclusions/Discussion</b> While this may seem like a very simple relationship, these results validated my hypothesis and were satisfying beyond words because at times, I was uncertain I could consistently generate a static charge and run trials. Replicating my design exactly and controlling for humidity may help future science students understand Sir Kelvin's discovery and generate their own reliable data. While it may be wishful thinking, perhaps future researchers will turn Sir Kelvin's 145-year-old discovery into a usable form of alternative power someday too.</p>	
<b>Summary Statement</b> My project proved that flowing water can successfully generate static electricity and that the drip rate speed directly effects the rate of static charge transmission, with a faster drip rate resulting in a faster spark rate.	
<b>Help Received</b> My father helped me use power tools to build the apparatus; the three designs were based on my research and ideas. My dad also helped attach the title to my poster board.	