



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Richard Xu</b>	<b>Project Number</b>  31139
<b>Project Title</b> <b>Thermal Piling Power</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective was to find out whether thermopiles could be made more effective through type change, temperature change, and number change.</p> <p><b>Methods/Materials</b> Thermopiles (Thermocouples Type K and Type E), solder/soldering iron, oven, voltage meter.</p> <p><b>Results</b> The test resulted in larger numbers of thermocouples reducing the voltage output. The E type produced more electricity than that of type K, but declined more as well. Type E produced almost 4 times more electricity than type K, but electricity drop was higher. The Type K thermopile had a fairly straight growth in electricity output, while the type E thermopile had a varying range in tests that involved higher temperatures. This means that probably Type E is not as well suited to hot environments as Type K.</p> <p><b>Conclusions/Discussion</b> The project ended up differently than what was hypothesized. It was hypothesized that the electricity would grow with more thermocouples and temperature, because they would form a chain and pick up more heat. Both types of thermocouples showed signs of decline instead of increase.</p>	
<b>Summary Statement</b> More heat/numbers means less electricity proportionally for all types of thermocouples.	
<b>Help Received</b> Father assisted in building thermopiles, Mother helped in building thermopiles. General Atomics allowed use of hot plate.	