



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Conner R. Bennett	Project Number J0202
Project Title Biomimetic Water Striders: Testing the Load-Bearing Capacity of Static Water Strider Models	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine whether a static mechanical water strider model can be built that carries 15 times its body weight and does not break the surface tension of room temperature tap water during a 3 minute time trial.</p> <p>Methods/Materials A control and five test water strider models were made of stainless steel cotter pins, glue, and hardened stainless steel wire, shaped to mimic the water strider insect. Silicone-based spray simulated the hydrophobic quality of the insects legs. Each models ability to float was tested three times for 3 minutes using tap water. The results were recorded. A static force calculation was made for comparison.</p> <p>Results The stability of the static water strider models enabled them to carry 2X, 4X, 12X, and 15X its body weight in three trials, for 3 minutes. The water strider model carrying 20X its body weight sank during all three tests. The static force mathematical calculations indicated that the surface tension of water could theoretically support each models weight.</p> <p>Conclusions/Discussion The data supports my hypothesis that a static mechanical water strider model can be built that carries 15 times its body weight. The standing water strider model floated three times, for three minutes carrying 15 times body weight. The data demonstrates that some of the static weight bearing characteristics of water strider insects can be duplicated in a water strider model design.</p>	
Summary Statement Test the carrying capacity of a static water strider model, relative to the water strider insect, using the static force calculation to indicate whether the surface tension of water could theoretically support each models weight.	
Help Received My parents provided tools, drove me to purchase materials, and answered questions during the research conducted primarily at home. Dr. P. J. Utz, Stanford University School of Medicine, provided access to the analytical balance.	