Executive Summary

Over a nine month period, the senior project team worked closely with the San Luis Obispo Children's Museum to develop a new interactive exhibit for the museum's Science, Technology, Engineering, and Mathematics (STEM) floor. The initial budget given for this project was $3,000. The museum's requirements for a new exhibit were that it must be safe for young children to use, require minimal supervision, is interactive, has learning objectives, and is economically feasible and sustainable. The team chose to build an exhibit that would teach young children about simple circuitry and electronics.

First, extensive research of circuits, children's museums, children's safety laws and practices, attention span of the relevant age group of children, and existing solutions was completed in order to build a strong background on the topic. An observational time study was also done at the SLO Children's Museum to gather more information about the end user. Next, a conceptual model of the exhibit was formed.

Through an iterative design process, the team developed multiple functional prototypes and conducted electronic testing to reach a final design. The exhibit is made up of three interactive stations that each teaches a unique concept. The stations include an interface that requires user input to cause a response. The first station teaches how different resistance affects a circuit, namely, Ohm's Law. At this station, the user compares the effect a big resistor and a small resistor would have on a circuit involving an LED fan. The second station teaches the concept of completing a circuit in order to function correctly. Here, the user builds a circuit using childproofed custom pieces that will, if done correctly, illuminate an electroluminescent (EL) wire that is outlined in the shape of a volcano. The third station teaches the idea of electronics

and circuits being a part of everyday life. This station is a plexi-glass display that includes everyday devices opened up to show their internal circuitry and wiring. In addition, the team also worked with the museum to construct effective and simplified signage that would instruct the user on how to interact with the exhibit.

The exhibit is scheduled to be open by July of 2015. Furthermore, in order for the exhibit to be maintained, the team has built numerous, interchangeable spare parts and have given design specifications and a build manual to the museum to refer to. Ultimately, the team was successful in staying within the budget by only spending $388.62 overall.