



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> <b>Fiona P. Koval</b>	<b>Project Number</b> <b>J0710</b>
<b>Project Title</b> <b>Blind Navigation: Getting from Point A to Point B</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of my project was to determine what type of audio cues would help a person navigate in the absence of visual reference points.</p> <p><b>Methods/Materials</b> The materials used in the experiment included a large field, a 100' measuring tape, flag markers, a blindfold, a set of walkie-talkies, a whistle, and a smartphone with GPS application. Test subjects were blindfolded and asked to walk a straight path to a finish target directly in front of them at the opposite end of the field. During the tests, subjects heard (a) a sound generated at the end target (whistle blast every 5 seconds), (b) verbal instructions to correct to aid subjects in staying on course (i.e., left, right, slight left, slight right or on course every 5 seconds), or (c) no audio cues. Tests were considered complete if the subject was able to successfully reach the end zone of the course (the line at the end of the course parallel to the starting line), without straying out of bounds to either side of the course. Measurements were taken from the finish target to the point subjects crossed into the end zone, or went out of bounds.</p> <p><b>Results</b> In 100% of the 15 sound generator tests, test subjects successfully crossed into the end zone. The average distance from the finish target in the sound generator tests was 4.3 ft. Subjects successfully completed 78.6%, or 11 of the 14 verbal instruction tests. The average distance from the finish target in the verbal tests was 59.7 ft. Of the 15 control tests (no audio cues), 33.3% were successfully completed. The average distance from the finish target in the control tests was 133.9 ft.</p> <p><b>Conclusions/Discussion</b> Sound generated at a target end point and verbal instructions can be used to improve ability to navigate where visual cues are unavailable. Sound generator devices outfitted with GPS locators could be used as rescue equipment in areas of dense forests, allowing missing persons to aid in self-rescue by making their way to a sound generator and signaling for help. A smart phone application that uses verbal directions could be created to help blind people navigate when walking in urban areas.</p>	
<b>Summary Statement</b> In this experiment, blindfolded test subjects successfully used audio cues to improve navigation toward a set target point.	
<b>Help Received</b> My parents drove me to the experiment site and helped in running the tests.	