



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

<b>Name(s)</b> <b>Melina Ghodsi</b>	<b>Project Number</b> <b>S1011</b>
<b>Project Title</b> <b>Monitoring Respiration Utilizing a Low-cost Accelerometer Sensor to Prevent Sudden Infant Death Syndrome (SIDS)</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> Develop an inexpensive and effective sensor that would be able to prevent SIDS by recognizing when respiration in infants stopped while also being easy to wear and easy to alert parents through a wirelessly connected smartphone.</p> <p><b>Methods</b> An accelerometer sensor was created by connecting the sensor to an adafruit feather board that has a built-in microcontroller to process the information and bluetooth to send the data to a smartphone. The system includes an attached Lithium Polymer Battery to power the sensor and a mini-usb port to charge the battery. The system was programmed with Arduino to be able to send the alert to the phone when there was no breathing.</p> <p><b>Results</b> The sensor was able to detect the movement of the test subjects bellies when breathing. When the test subject was asked to hold their breath, the system was also able to recognize the no breathing stimulation. After 10 seconds of no breathing, the system sent an alert to the parents smartphone so that the parents could reach their child in time.</p> <p><b>Conclusions</b> As a result of the sensor being able to accurately detect when breathing stops, it is able to prevent sudden infant death syndrome by alerting parents. The global issue of SIDS has not been able to be stopped because of the high cost of the available sensors on the market. However, with this novel, low-cost accelerometer sensor, it is accessible to all people and can tackle this issue on a larger scale. This system can also bring peace of mind to parents when they know that even when they are not watching, a simple sensor is monitoring their child.</p>	
<b>Summary Statement</b> In order to prevent sudden infant death syndrome, I devised a low-cost accelerometer sensor that is able to detect when breathing stops and able to send an alert to parents smartphones.	
<b>Help Received</b> My mentor throughout the project was Professor Majid Sarrafzadeh from UCLA. He allowed me to do this project with the guidance of a PhD students in his research laboratory.	