Developing a pH Sensor Using a Raspberry Pi to Monitor Ocean Acidification, Year Two

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This science fair project worked to develop a solution to the problem of infeasible and inaccurate deployable pH sensors not suited for the marine environment reduce the quantity of accurate ocean pH data on a worldwide scale. To solve this, the device had to accurately monitor ocean pH by taking pH readings that are consistently accurate within a range of ±0.002. The sensor will be in a watertight capsule, submersible to 1-3 meters, that is powered by an internal battery assisted by solar power. The project involved designing and programming a sensor and capsule that performs in accordance with the engineering goal. The sensor is currently in the testing stage. The results indicate that the sensor is accurate and consistent, varying ±0.007. The sensor functions the most accurately at a pH of 7.000. The sensor displays the lowest accuracy and consistency when tested in a pH 10.000 solution. Further testing in accuracy and consistency in variable temperatures and salinities is required. The the protective capsule for the sensor is being prototyped and designed. Obtaining or designing a battery system to power the sensor has proved difficult. To supplement the power for the device, a solar panel was incorporated into the capsule design. This project is a different approach to the problem of lack of global pH data. The sensor being designed has displayed that it is up to four times more accurate and consistent as the leading deployable pH sensor and 1/30th of the price.

Awards Won:

Arizona State University: Arizona State University Intel ISEF Scholarship