Developing a pH Sensor Using a Raspberry Pi to Monitor Ocean Acidification

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This science fair project worked to develop a solution to the problem of inaccurate testing devices that are not well suited to the marine environment inhibit effective pH monitoring of the changing ocean. Human error influences data and leads to inaccuracy. Small sample sizes and insubstantial data hinder correlations of global environmental fluctuations and trends and ocean pH. Solving this involved creating a method of testing pH with these goals: To create an autonomous pH testing device that is easily and affordably ($200-$400) reproduced, pH accurate to the hundredths place, regularly (once every 12-24 hours) takes readings, wirelessly and instantaneously transmits collected data, durable, optional continuous reading modes, waterproof, low maintenance (few calibration requirements), battery or solar operated, and submersible in 1-3 meters of water. This project provided experience with electronics and using a Raspberry pi in connection with the Atlas Scientific pH Kit. The project involved designing a testing device that could perform according to the goals and standards listed above and building it. The sensor is currently in the testing stage. From current results, it can be determined that both the accuracy and the consistency of this probe are low. Further testing in accuracy, consistency, effectivity in variable temperatures and salinities is required. Understanding the changes in climate, including the changes in ocean pH (ocean acidification) will take thousands of data collection events over decades. This engineering project adds to the accessibility and affordability of pH testing devices for the marine environment.

Awards Won:

Third Award of $1,000