Low-Cost Solar Powered Water Quality Monitoring Device With 24/7 Uploading to Public Access Website

Driscoll-Natale, Jack (School: Pacific Collegiate School)

I designed and programmed a surface water quality monitoring device that continuously samples for three key water health parameters and sends the monitoring data in real time to an open access website I created. My device and website provide the public with water health data that is easily accessible, accurate, timely, low cost, and solar powered. After four iterations I arrived at my current design, an Arduino based system measuring water pH, Oxygen Reduction Potential, and Temperature using continuous electronic analog sensors. While low-cost, my device is extremely accurate. I parallel tested my device with a $2,500 multi sensor in a university lab and found an average marginal difference of 1.08% between test measurements in a variety of different water types and temperatures. Using an onboard ESP8266-01S Wifi chip, my design wirelessly uploads each datapoint every 10 seconds to my public access website. Unlike current methods of viewing local water quality data online, my website is completely free for viewing the data in long-term graphs, and downloading the raw data for personal use. My device, powered through a rechargeable-solar circuit, costs less than $300 in materials (compared to industrial grade units costing up to $150,000) and can be replicated to create a meshed system of continuously reporting units that provide the public with free real-time information on their local waterways. My device and website function as an ecological indicator, alerting the public to real time threats and displaying long-term trends.

Awards Won:

Arizona State University: Arizona State University ISEF Scholarship (valued at up to $52,000 each)