

# Arduino Powered Weather Station for Wind Power Generation Prediction

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## Introduction

Sustained growth in offshore wind power opportunities requires a skilled technical workforce to meet industry labor demands. This research aims to develop a “hands-on, minds-on” project for a wind power-specific curriculum that seeks to develop students for the wind power workforce.

## Methods

Different areas of the Wind Energy sector were evaluated, with information taken from current members of the sector, as well as members of academia. One point of importance rose to the top: data. With hundreds or up to thousands of sensors on offshore turbines, having students understand data collection and analysis becomes vital.

## Results

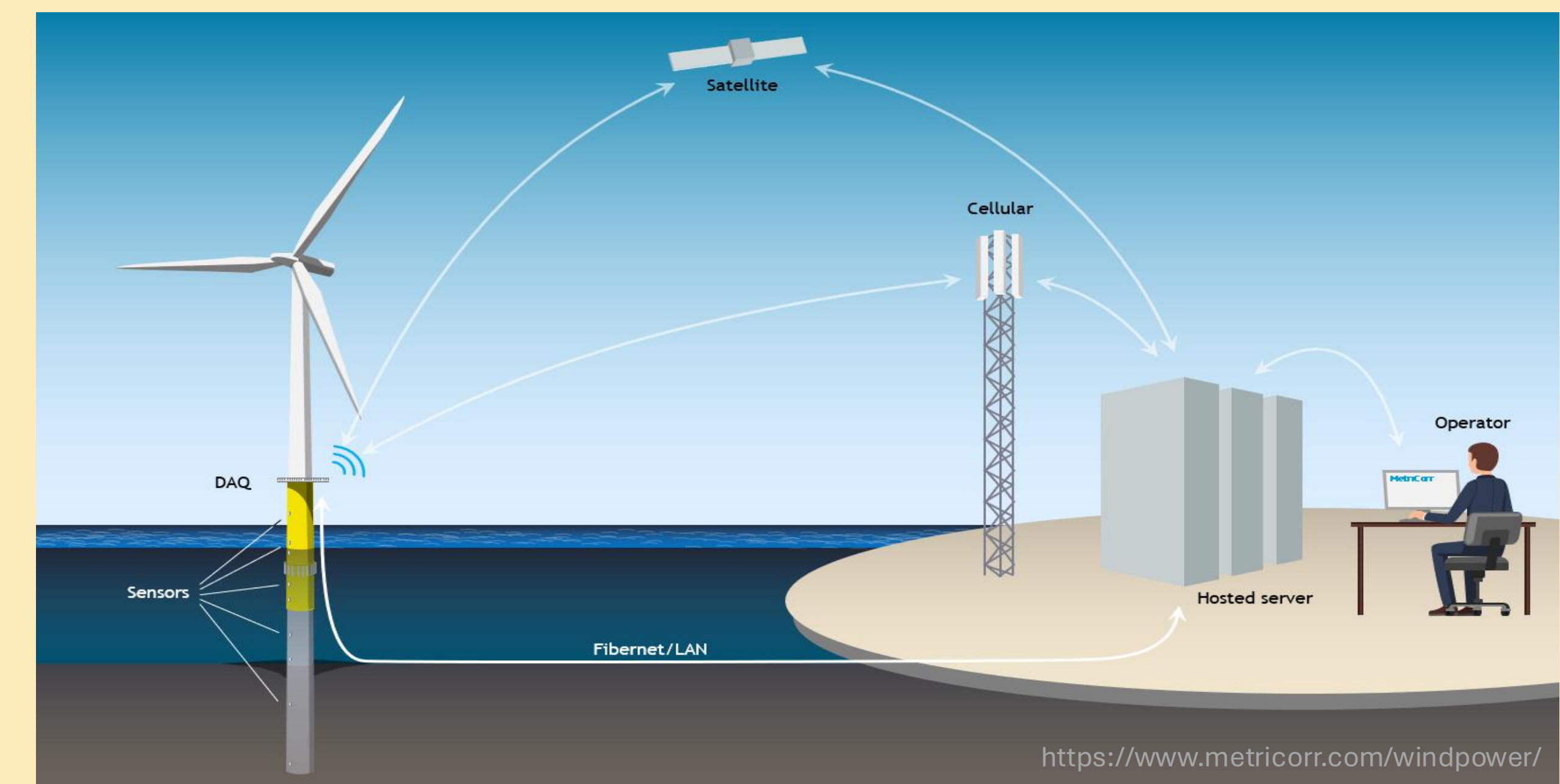
Students will design and build a compact weather station capable of monitoring the current weather through Arduino-integrated sensor modules. Students will develop code for the weather station to predict future weather metrics based on algorithms covered in their Wind curriculum coursework. With this tool, they will be able to estimate how much power can be produced by a wind turbine at the weather station's location.

## Discussion

To properly prepare a growing workforce, data collection and analysis is an important topic to cover. This project teaches students the importance of that topic and leaves them with a practical tool to understand the physical impact of data on wind turbine performance.

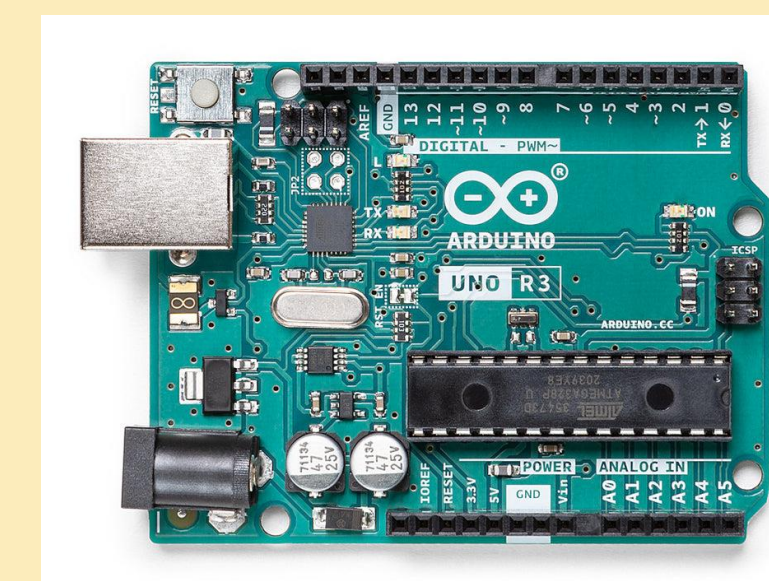
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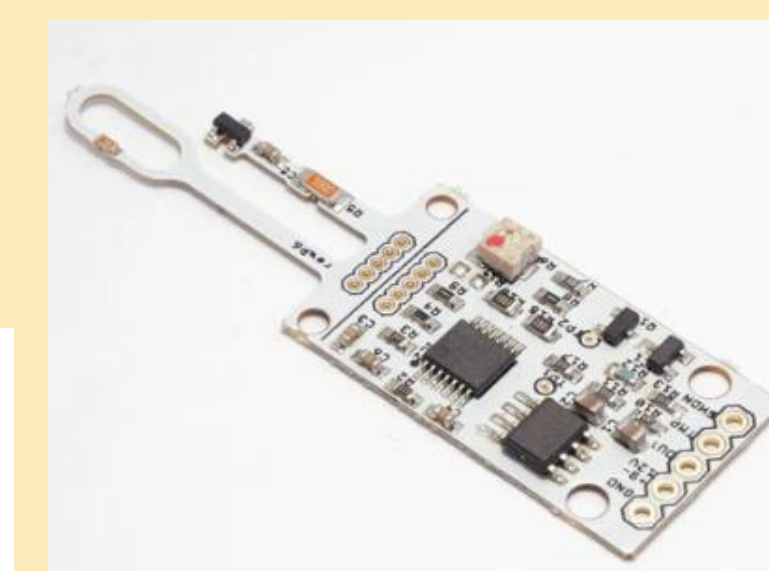


Example of Real-World Data Collection

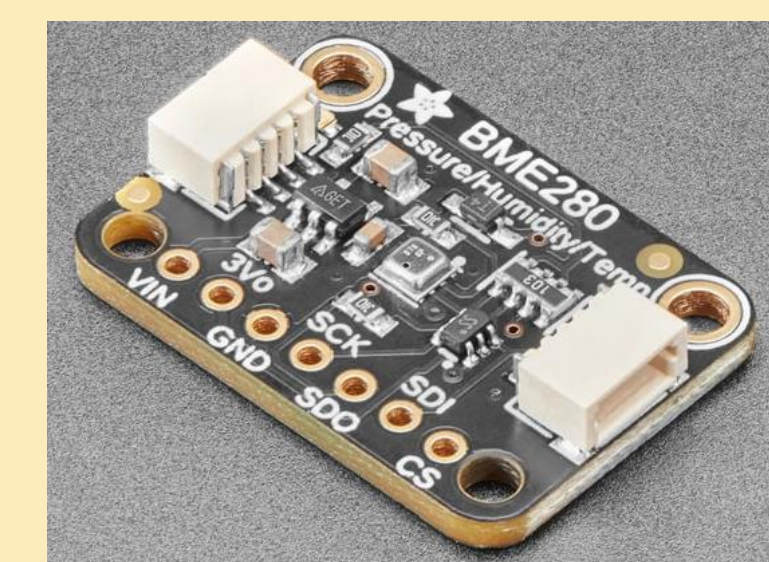
## Core Components



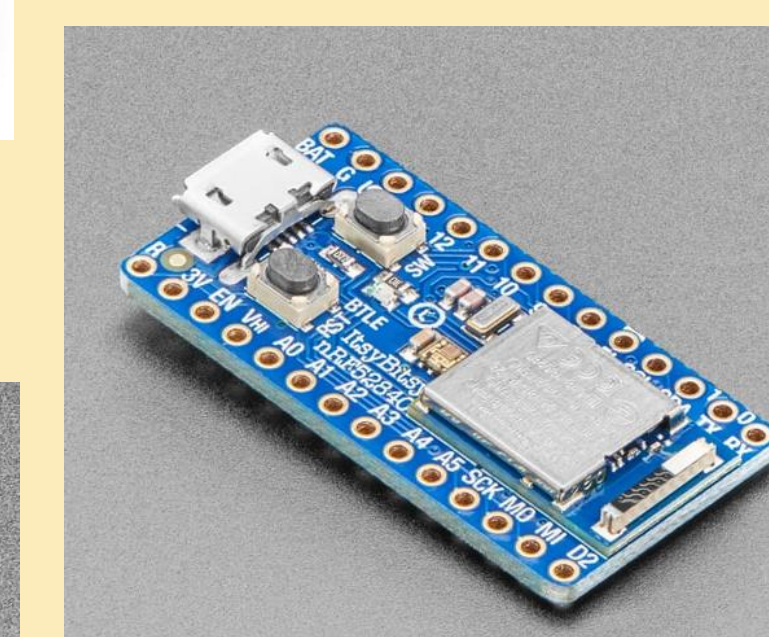
Arduino Uno



Hotwire Anemometer



Temperature, Pressure, Humidity Sensor



Bluetooth Module

## CAD Prototype



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