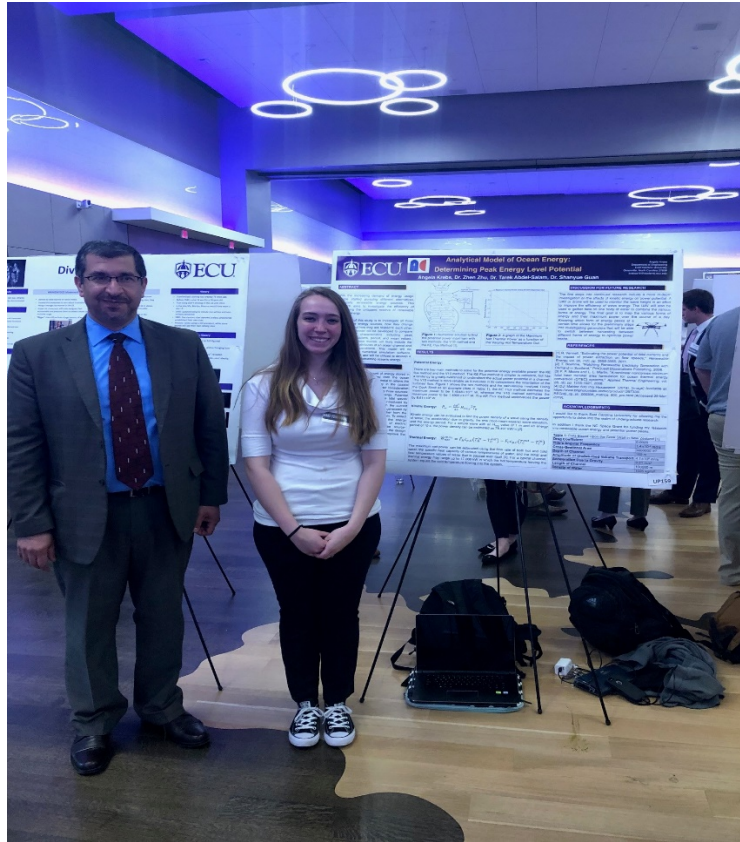


## Analytical Model of Ocean Energy: Determining Peak Energy Level Potential



With the increasing demand of energy usage, people started pursuing different alternatives, especially renewable energy sources. This research aims to investigate the efficiency of harnessing the untapped reserve of renewable oceanic energy. Considering the large amount of energy stored in the ocean, energy harvested from the ocean through tidal waves has the potential to relieve the stress of traditional fuel energy in the coastal regions. The oceanic energy under consideration in this work includes the following three sources: potential, kinetic, and thermal energy. Potential energy can be gathered from the tidal waves' height variation. Kinetic energy is introduced by the movement and speed at which the current carries the wave. Thermal energy is generated by the heat changes in the ocean, either from the movement of waves or creatures within. To collect the energy in an ocean channel, the energy harvesting devices (different types of electric generators, for example) would be source-specific. Furthermore, it is critical for the design and application of these devices to improve the efficiency in energy conversion.

The focus of this study is to investigate all three types of the energy sources, how they change over time, and how they are related to each other. A numerical model will be developed to compare the energy characteristics including peak amplitude, variations, period, and mean values. The input to these models will likely include the constraints and attributes of an ocean channel and local weather conditions. This model will be implemented in numerical simulation software, such as MATLAB, and will be utilized to develop a better strategy of harvesting oceanic energy.