Antipodal Algae: Engineering Energy Solutions for a South Pacific Island

Chen, Amelie (School: Pacific Horizons School)

As the emission of carbon dioxide into our atmosphere continues to contribute to climate change, the search for cleaner energy sources prevails. Using algae as a biofuel can replace the use of diesel fuel in American Samoa because algae is both naturally abundant and grows at a fast rate especially in the tropical temperatures of the island throughout the year. Algal biofuel is also a very promising fossil fuel replacement due to algae's high levels of lipids which can be extracted efficiently without the use of dangerous chemicals. To further expand on producing algal biofuel in American Samoa, the researcher created a python program to compute and calculate evapotranspiration, an important factor to farming algae in American Samoa. Using the Penman-Monteith equation, a multiplex mathematical equation, the researcher was able to calculate evapotranspiration rates across the island of Tutuila and produced a program that searches and displays evapotranspiration rates. She concluded that the midwest region of Tutuila, American Samoa is the most suitable location for algae cultivation because of its low evapotranspiration and high rainfall rates. In the end, the researcher was able to expand the possibilities of converting algae into biofuel and calculated the feasibility and most suitable region for algal cultivation. Thus, this experiment provides American Samoa the opportunity for the island to utilize a sustainable, renewable, and locally available energy source, which can help reduce the use of fossil fuels and help preserve and protect the environment by lowering the amount of carbon emitted into the atmosphere.

Awards Won:
Fourth Award of $500