In February, USF FESC awarded seed grant funds for promising cutting-edge renewable energy research. The Engineering research team of Sarina Ergas, Qiong Zhang, James Mihelcic and John Wolan have created an interdisciplinary team integrating microalgal biofuel production with wastewater treatment and carbon recycling.

Microalgae are productive at utilizing CO2 and can generate biomass for production of biodiesel, methane, or other fuels as well as valuable co-products (e.g. animal feeds, polymers). Algal biofuel production can be more profitable and sustainable when combined with wastewater treatment and CO2 utilization from electric power generation facilities.

 Sustainable algal biofuels research is particularly relevant to Florida due to favorable sun exposure and temperature conditions and the large number of sites with proximity to fossil fuel based power plants and wastewater resources. Combining algal biofuel production with wastewater reclamation is particularly relevant to Southwest Florida, as control of nitrogen inputs to the Gulf of Mexico has resulted in stricter regulations for domestic, agricultural and industrial wastewater.

The Ergas et al. team is investigating the effects of gas transfer and mixing on biomass production and CO2 and nutrient uptake in algal photo-bioreactors supplied with wastewater and combustion gases.

Both oil rich algal species and algae that grow well on wastewater will be investigated. Batch culture studies are being conducted with three different types of algae: *Chlorella vulgaris, Botryococcus braunii*, and a wild type culture harvested from clarifieers at a weastewater treatment plant. *C. vulgaris* is a green algae known to grow well on wastewater; *B. braunii* has a high lipid content and can be used for biodiesel production. The wild culture contains three different algae species. The algae are being grown in defined culture media, sludge concentrate, and wastewater. Measurements include biomass dry weight, chlorophyll, lipid content, total nitrogen, total phosphorous, ammonia, nitrate, phosphate, and chemical oxygen demand.