

FLORIDA STATE UNIVERSITY

Planning Grant: Constructual Optimization of Solar Photo-Bioreactors for Algae Growth

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Students: Quinn Straub (MS), Tom Tracy (MS)

Description: This is a planning grant (15K, only). As such, the work proposed, will be targeted towards placing us in a more competitive position in future submissions in the area of bio-fuels. By the end of this one-year effort we expect to: (i) have a complete design of a small-scale photo-bioreactor for algae growth and, (ii) obtain additional funds that will allow us to build a large-scale photo-bioreactor and conduct the necessary research for its optimal design and operation. A technical report will be delivered by the end of the one-year period.

Budget: \$15,000

Universities: Florida State University

External Collaborators: Federal University of Parana, Brazil

Progress Summary

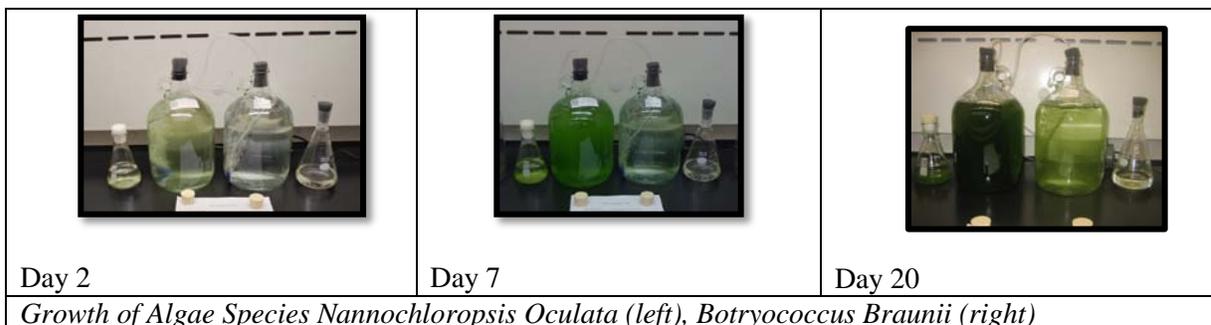
Research Objectives for Current Reporting Period:

As a planning grant, the main objectives for the project are to enhance our laboratory capabilities and personnel qualifications to make us more competitive for other solicitations.

Progress Made Toward Objectives During Reporting Period:

Personnel training: Two students (T. Tracy and Q. Straub) were sent to a 2-day seminar hosted by the University of Texas at Austin. The seminar exposed the students to fundamentals of the biological interactions of micro-algae, culturing techniques, culture maintenance, as well as, proper use of lab equipment. They also toured a culture collection, that is one of the best in the world (Over 3,000 species).

Laboratory enhancement: We acquired a Vernier photo-spectrometer, and a microscope. Simple experiments were conducted to familiarize mechanical engineering students with the use equipment typically found in a biology laboratory. The students learned how to grow *Nannochloropsis Oculata*, measure cell concentration with a Newbauer hemocytometer and a fixed volume micropipette, and measure sample's absorbance using the Vernier photo-spectrometer.



Synergistic Activities:

Collaborations:

Our group collaboration with Brazilian researchers for over 10 years has produced results that leverage the efforts of the current planning grant, some of those results are listed below.

Publications:

J.C.L Torrens, J.V.C. Vargas, E.C. Telles, A.B. Mariano, J.C. Ordonez, “ Biodiesel From Microalgae: The Effect of Fuel Properties on Pollutant Emissions,” COBEM, Gramados, Rs, Brazil, Nov. 2009.

R.L.L Ribeiro, A.B. Mariano, J.A.Souza, J.V.C. Vargas, J.C. Ordonez, “Numerical Simulation of the Biomass Concentration of Microalgae Cultivated in a Self-Sustainable Photobioreactor,” COBEM, Gramados, Rs, Brazil, Nov. 2009.

Invited Talks:

J. C. Ordonez, “An Overview of Microalgal Biodiesel,” Ubatuba, Brazil. Oct, 2009. Visit sponsored by the State of Sao Paulo.

J.C. Ordonez, Thermodynamic Optimization of Energy Systems, Manila, NEECC-IEEE, Philippines, Dec. 10, 2009. (as part of IESES-FSU delegation to Philippines)

Invention disclosure:

“Compact Photo Bioreactor for Microalgae Cultivation,” J.V.C. Vargas, W. Balmant, A. Stall, A.B Mariano, J.C. Ordonez, Z. Hovsapien

Proposal Submissions:

Proposed work (over \$500K budget) in micro-algae related work as part of the DOE ERIC program. Participated in the writing of FSU position paper to USAID, which includes work in micro-algae. Met with Philippine National Academy members from Ateneo and De La Salle Universities to discuss collaboration opportunities in microalgae efforts.