# SWES Colloquium Series 2014-2015

**Department of Soil, Water and Environmental Science**

## *The Road to Economically Viable Algae Biofuels: The ARID raceway*


## Randy Ryan

**Assistant Director of the Arizona Agricultural Experiment Station**


Algae biomass and oils can be employed as an environmentally sound replacement for fishmeal and petroleum. Pelagic fish (small free swimming fish like sardines) are harvested from the oceans to make fishmeal for aquaculture and animal feeds. The harvesting of billions of pelagic fish undercuts the ecology of the oceans resulting in the decreased productivity of wild fishand severely impacting marine mammals. Algae oils are easily converted to biofuels which are expected to replace a significant portion of the $1 billion dollars per DAY petroleum used in the United States with the hopes of having a significant impact on global warming. In an ideal production scheme, both food and fuel products would be employed to make algae farming economically viable.

The ARAB oil embargo in the early 1970's set in motion a movement to propose that algae was capable of producing enough oil to become economically viable and compete with petroleum at market prices. Hundreds of companies and universities have proposed a myriad of cultivation solutions such as: using catfish ponds, open circular raceways, plastic bags floating in pools (and the ocean), photobioreactors, vertical and horizontal bioreactors, aeroponics, fermentation vats, etc. Each is capable of growing algae but not enough to make algae biofuels economically competitive with petroleum. Many of these companies have dropped biofuels as the primary goal and have settled on making high value nutraceuticals and health food algae products. Many of these companies have successfully burned billion$ of private and federal funds to make biofuels economically completive. This is evident by the numerous bankrupt companies that 'litter the road' to successful algae biofuel production.

The Algae Raceway Integrated Design- ARID raceway was invented and Patented at the University of Arizona. The recently completed 2014 $70 million DOE, National Alliance for Advanced Biofuels and Bioproducts (NAABB) consortium final report documents through 4 years of scientific validation, that the ARID system is capable of growing enough algae biomass to make algae biofuels at $3.50/ gallon. The patented advantage of ARID is the thermal energy conservation provided by its unique design. Algae biomass production in ARID is double (50g/m2) that of traditional paddlewheel raceways with significant savings in OPEX and CAPEX. Advanced ARID platforms are expected to significantly increase algae biomass productivity and further reduce costs.

A new UA spin-out company Advanced AgroBioFuels, LLC has begun to commercialize the ARID platform. It is envisioned that production will begin in 2015.

## Monday, October 13, 2014 -- 3:00pm
## Marley 230

Refreshments at 2:45

ARIZONA | COLLEGE OF AGRICULTURE AND LIFE SCIENCES

School of Earth and Environmental Sciences