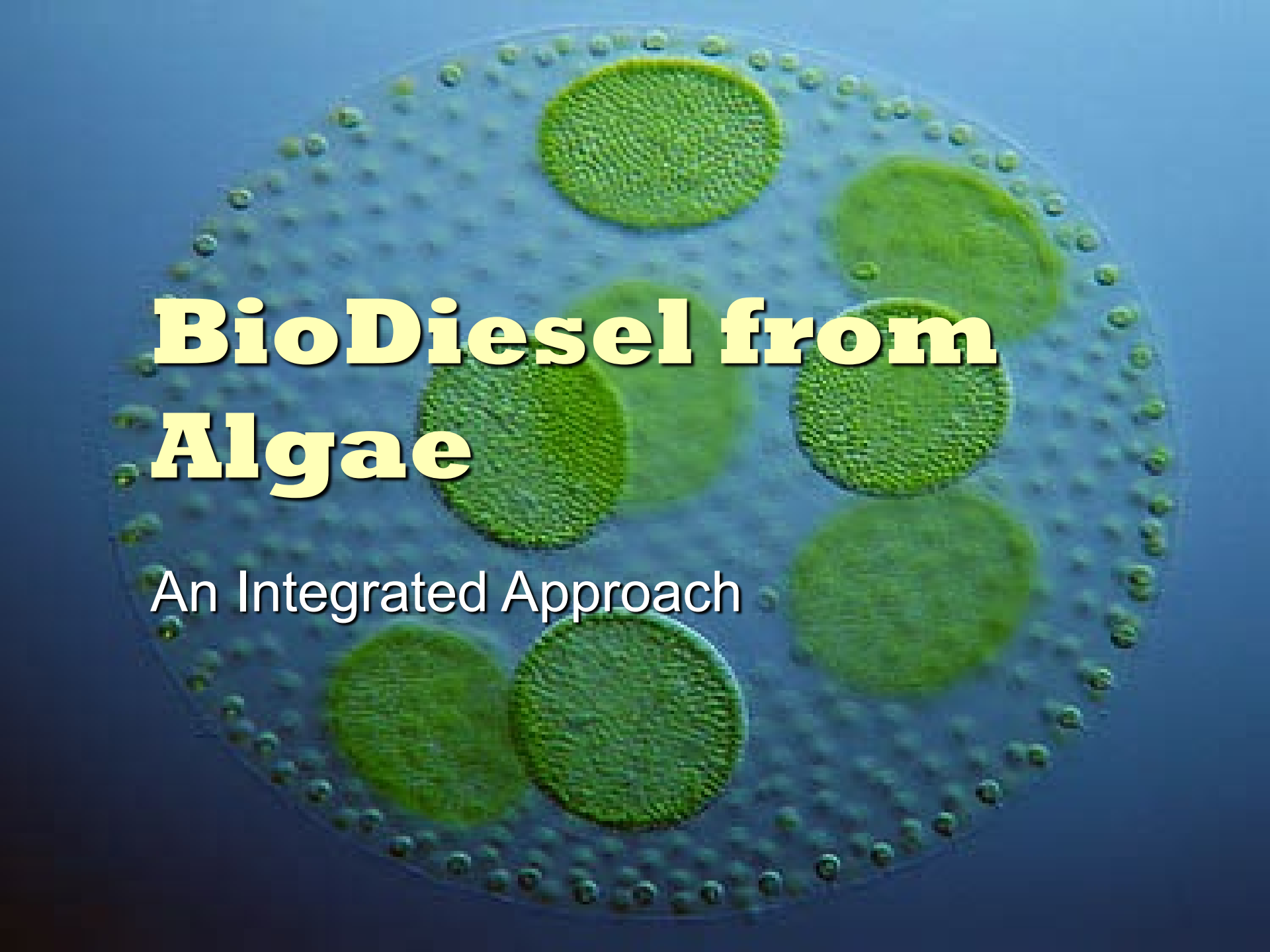
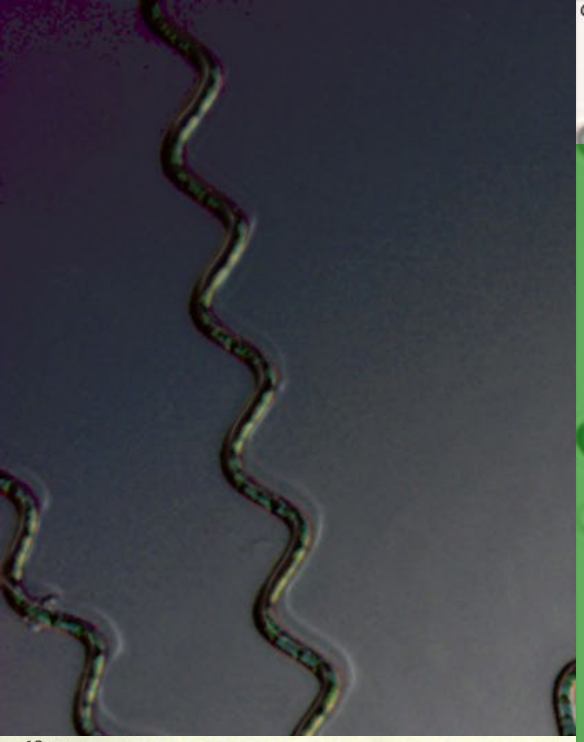
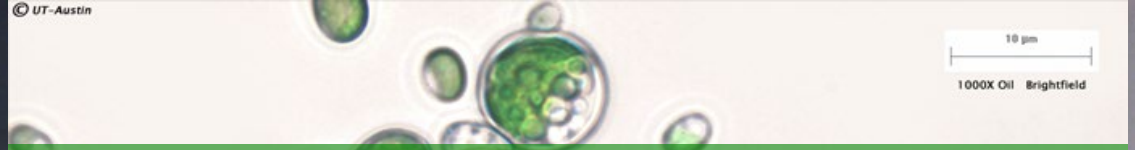
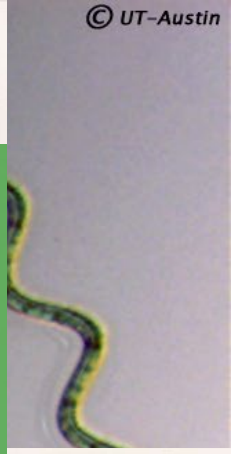
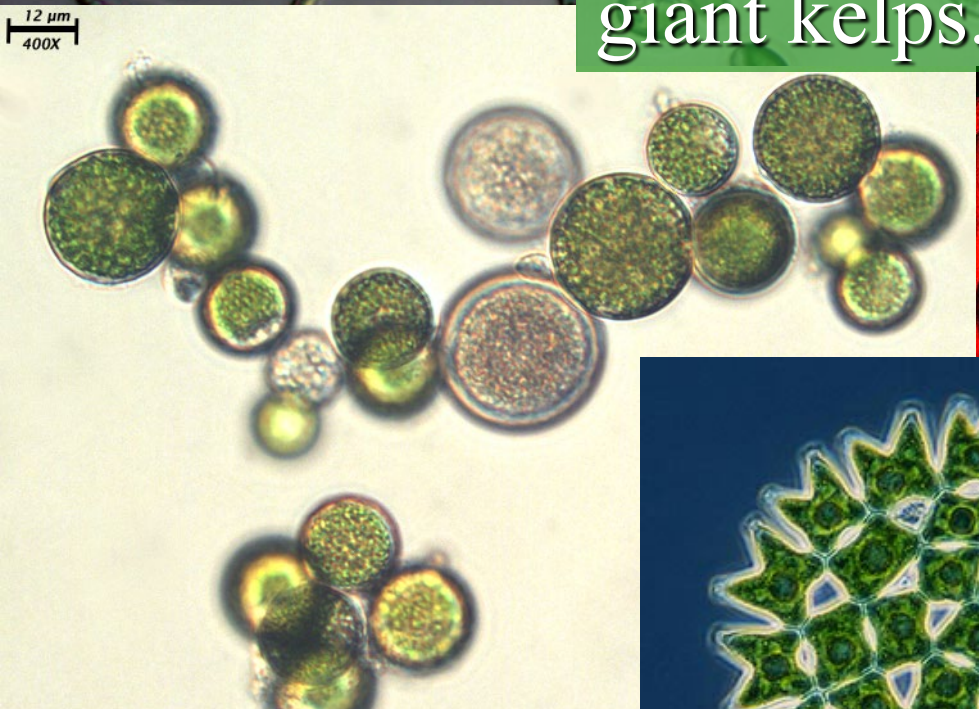

BioDiesel from Algae
An Integrated Approach

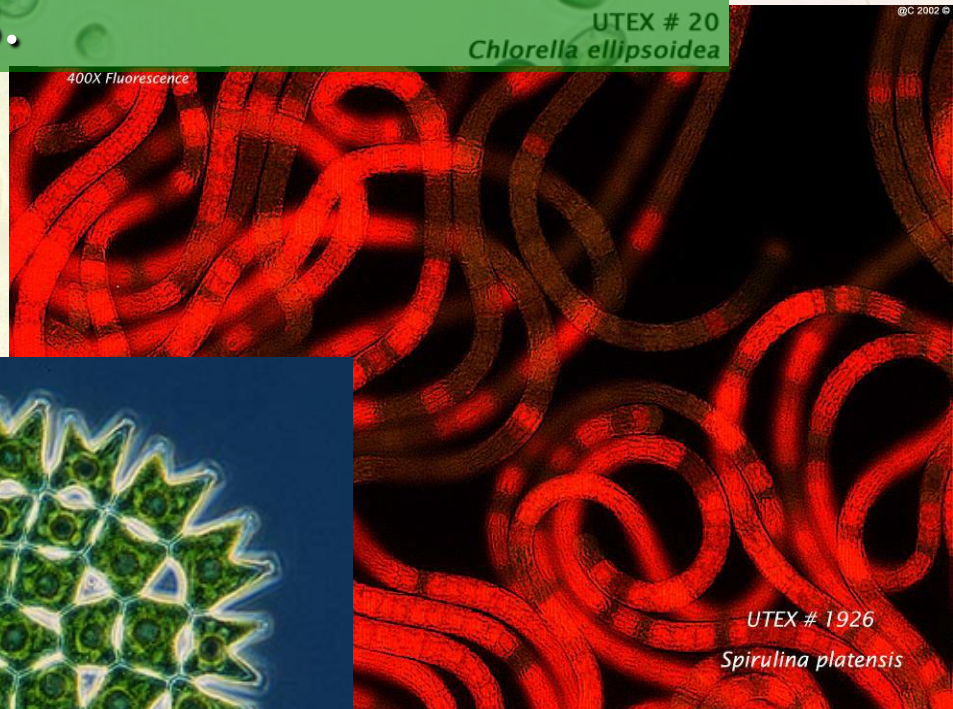






Algae (*pl. n.*) : any of various chiefly aquatic, eukaryotic, photosynthetic organisms, ranging in size from single-celled forms to the giant kelps.





UTEX # 20
Chlorella ellipsoidea

Why Algae?

- Photosynthetic organisms are capable of efficiently using solar energy and CO_2 to create biomass.
- Algae, like terrestrial plants, produce storage lipids in the form of triglycerides.
- Capable of utilizing high nutrients in waste water streams
- Incredible growth rates

Why Algae?

- As the use of biofuels expands globally, traditional food crops such as **corn** and **soy beans** are increasingly being used as feedstocks for the most popular liquid biofuels, ethanol and biodiesel, rather than as foods.
- This raises price competition between fuels and food commodities- not a **sustainable** practice.
- Algae can be grown on non-arable land, where food crops simply cannot grow.

Strain Selection

- 1. Lipid production
- 2. Biomass production rate
- 3. Resistance to photo-inhibition
- 4. Sensitivity to osmotic stress
- 5. Ease of Harvest

Waste Water Treatment Using Algae

- Algae have been used successfully to treat nutrient excess of sewage/manure wastes generated by animals and human activities (Nurdogan and Oswald 1995, Lincoln *et al.* 1996, Wilkie and Mulbury 2002).

- In concert with anaerobic digestion algae can eliminate waste water problems

Waste to Energy

- Algae thrive in high nutrient environments
- Transforming excess nutrients in wastewater into a high utility commodity: **BIODIESEL**
- CO_2 emissions, from combustion, can supplement algae photosynthesis rates

Project Goals

My project will deal with overcoming biological and technical obstacles

Primary Goal:

- Bio-prospecting for an alga suitable as a biodiesel feedstock

Secondary Goals:

- Efficient production of the alga
- Efficient harvesting
- Efficient oil extraction

Literature Cited

- Lincoln, E.P., A.C. Wilkie, and B.T. French. 1996. Cyanobacterial process for renovating dairy wastewater. Biomass and Bioenergy. Vol. 10:1 pp. 63-68.
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- Wilkie, A.C., W.W. Mulbury. 2002. Recovery of dairy manure nutrients by benthic freshwater algae. Bioresource Technology. Vol. 84:1 pp. 81-91.