A Feedstock to Tailpipe Approach to Sustainable Biofuel Production

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In 2009, US Oil Consumption was approximately 18.7 million barrels per day.

Renewable Fuel Standard
- 36 billion gallons of renewable fuel by 2022
- Corn based ethanol capped at 15 billion gallons
- Advanced biofuels defined by 50% reduction in lifecycle greenhouse gas emissions

Kansas is a major stakeholder in renewable fuels

http://www.eia.doe.gov/basics/quickoil.html
KU is unique in the Feedstock to Tailpipe© approach to sustainable biofuels production

Ecosystem Level Processes
(Ecology and Evolutionary Biology/Geography)

Biomass Production
(Ecology and Evolutionary Biology/Environmental and Chemical Engineering)

Alternative Fuel Assessment
(Mechanical, Chemical and Environmental Engineering)

Biomass Pre-Processing and Chemical Transformation
(Ecology and Evolutionary Biology, Chemical and Environmental Engineering)
Collaboration is the driver of the research team

Chemical Engineering
Aaron Scurto
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Laurence Weatherley
Alan Walker

Civil, Environmental and Architectural Engineering
Edward Peltier
Belinda Sturm
Dennis Lane
Ray Carter

Geography
Nathaniel Brunsell

Ecology and Evolutionary Biology
Sharon Billings
Jerry deNoyelles
Val Smith

Mechanical Engineering
Chris Depcik
Terry Faddis
A strength of KU is the expertise in all aspects of biofuels production, utilization, and impact assessment

- Internationally recognized expertise in algal ecology and the environmental controls of algal biomass production
  - KU field station, partnership with Lawrence wastewater treatment plant

- Research and large scale capacity for biofuels production and capability to fully characterize fuel properties
  - Partnerships with Kansas farmers, regional biofuel companies, and Kansas Soybean Commission
A strength of KU is the expertise in all aspects of biofuels production, utilization, and impact assessment

- Ability to investigate biofuel feedstock characteristics upon combustion, greenhouse gas and hazardous emissions
  - Partnerships with University of Michigan, Cummins, Westar, NASA, Renewable Energy Group, Iowa Interstate Railroad

- Relating ecosystem, land cover use and change, and regional climate variation to water, carbon, nitrogen, heat, and energy fluxes between the biosphere-atmosphere
  - Partnerships with other US and international institutions, Max Planck for Biogeochemistry, USDA
Current and future collaborations

- Biorefining – Fuels and Chemicals from Biomass (FTT, CEBC, NASA)
- Climate Change (IGERT, CReSIS)
- Alternative Energy (NSF EPSCoR)
- Economic Drivers (NSF EPSCoR)
- Societal Acceptance and Impacts (NSF EPSCoR)
- Land-use Impacts, Life Cycle Analysis (KGS, KBS)