

## **Authors, Titles and Abstracts of Posters for the UCONN Jan. 11, 2007 Biofuel Symposium**

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**Poster Title: “A Multidisciplinary Academic Group Dedicated to the Development of Green Alternative Energy in Connecticut- University of Connecticut Biofuel Consortium”.**

**Poster abstract:** Our focus:

1. Primary research in the area of green alternative energy.
2. Application of primary research into commercial scale operations.
3. Development of an undergraduate engineering educational program.

What makes us unique:

Our focus is the development of green alternative energy from commercial waste rather than fresh starting materials.

Specific examples:

- Biodiesel derived from waste cooking oil.
- Comparison of waste oil to virgin oils produced in CT from oilseed crops grown in an integrated pest management program.
- Using micro wave technology to enhance the rapid conversion of the vegetable oils to biodiesel.
- Development of biodegradable polymers from waste glycerol.
- Development of Syngas from Glycerol to produce low molecular weight alcohols.
- Use of biodiesel to produce hydrogen streams for fuel cells.

**2. James D. Stuart, Matt Boucher, Bob Fusco, Ben Lavoie, Cliff Weed and Richard Parnas, UCONN Biofuel Laboratory, Univ. of CT, Storrs, CT 06269, tel. no. 860-214-1478, E-mail: [James.Stuart@uconn.edu](mailto:James.Stuart@uconn.edu),**

**Poster Title “Using ASTM Methods to Test Biodiesel Samples”.**

**Poster abstract:** To characterize various student-made and commercial biodiesel (B-100) samples, six different ASTM methods have been implemented here at UCONN’s Biodiesel laboratory located in the Department of Chemical Engineering. Those methods are the following:

1. **Acid Number (Manual) ASTM D664**
2. **Cloud Point (Automated) ASTM D2500**
3. **Flash Point ASTM D93**
4. **Viscosity Kinematic (Manual) ASTM D445**
5. **Water and Sediment ASTM D 4007**
6. **Free and Total Glycerin (ASTM D6584)**

To prove that our laboratory’s results are accurate and meaningful, our group chose to participate in ASTM’s Biodiesel Cross Check Program starting in January 2006. In this program, every three months the ASTM organization sends to each of the participating laboratories one-gallon of an unknown B-100 sample to be analyzed using their existing methodology. Six weeks are allowed for completing the testing with the results then submitted via a secure ASTM web site for compilation. As of this date we have participated in three rounds of testing (most recently ending in November 2006). This poster will compare the values that our laboratory has reported and compared to the robust mean and robust standard deviation as compiled by the ASTM from the about thirty independent laboratories participating in this ASTM sponsored program. It is interesting to note is that presently our UCONN laboratory is the only academic laboratory listed as participating in this round-robin comparison study that seeks to compare and improve the testing of B-100 samples.

**3. W. Deng, L. Lu, and Y. Li, Department of Plant Science, University of Connecticut, Storrs, CT 06268 tel. no. 860-486-6780 E-mail: [Yi.li@uconn.edu](mailto:Yi.li@uconn.edu)**

**Poster title: “Development of Faster-Growing Poplar for Biofuel Production”**

**Poster abstract:** Poplar is an important feedstock for liquid fuel, power and chemical production. Because the biomass can count for 30% to 50% of the total costs for biofuel production, increasing bioenergy crop growth will lead a significant reduction in the final price of biofuel. We have recently developed a gene transfer technology to drastically increase growth rate of bioenergy crops. As demonstrated in poplar plants, we can enhance the biomass production of poplar by 80%. The technology may contribute to the overall competitiveness of biofuel with fossil fuels.

4. **Julia Kuzovkina, Dept. of Plant Science, University of Connecticut, Storrs, CT  
Tel. no. 860-486-3438, E-mail: jkuzovkina@uconn.edu**

**Poster Title: “Biomass for Energy: Global Development of a Short-Rotation Willow Crop”**

**Poster Abstract:** Willow was proposed as a biomass crop for bioenergy and bioproducts in the mid 1980's when energy problems became obvious. Today a few counties with extensive expertise in willow cultivation are involved in research that aims to explore the genetic potential of the genus *Salix* and to make it a reliable bioenergy crop. Research directions range from the basic biology of the genus to the creation of new markets for energy crops and value-added products. Knowledge acquired from extensive work in the United Kingdom, Sweden, Canada, and the United States contributed considerably to the development of modern willow biomass production systems.

5. **Dr. Walter J. Krol and Dr. James A. LaMondia, The Connecticut Agricultural Experiment Station, 123 Huntington Street, New Haven, CT 06504, E-mail:  
Walter.Krol@po.state.ct.us**

**Poster Title: “Oilseed Crops for Biodiesel and Conversion of Oilseed to Biodiesel**

**Poster abstract:** The Connecticut Agricultural Experiment Station has recently been charged with investigating the production of oilseed crops in Connecticut. We are conducting research to evaluate the growth and yield of these crops either as summer rotation crops or as winter cover crops with spring seed harvest, where appropriate. Seed and oil yields, characteristics, and the fertilizer value of remaining meals after oil pressing are being investigated. Additional studies in the conversion of the triglyceride esters into biodiesel fuel, and of oilseed crop efficacy against plant pathogens are being conducted in small research plots.

6. **Paul Niznik<sup>1\*</sup>, Gene Bartholomew<sup>2</sup>, Gus Kellog<sup>3</sup>, P and K Industries, Berlin CT 06037 USA. <sup>2</sup>Porter and Chester Institute of Branford, Branford, CT 06405 USA. <sup>3</sup>Greenleaf Biofuels, Guilford, CT 06437, tel. no. 917-687-3748, E-mail paul@pandkindustries.com**

**Poster Title: “Introducing a Competitive Biofuel Blend for Oil Furnaces”.**

**Poster abstract:** We present the first comparison of all current liquid biofuels on home heating furnace platforms. A new biofuel blend made with less refined vegetable oil feed stocks is tested on stock equipment and over several years in home furnaces. The new blends are shown to be the first biofuel to be below the cost of petroleum while still producing emission benefits. An analysis of the production of biofuels in Connecticut for the heating fuels market shows that vegetable oils are most economically used in these less refined blends.

7. **Chetan Shende, Frank Inscore, Wayne Smith and Stuart Farquharson, Real-Time Analyzers, Inc., 362 Industrial Park Rd #8, Middletown, CT 06457, tel. no. 860-635-9800, E-mail [stu@RTA.biz](mailto:stu@RTA.biz)**

**Poster Title: "Raman Spectral Analysis of Biodiesels".**

**Poster abstract:** Biodiesel has become the foremost alternative fuel to those refined from petroleum products, since it can be produced from renewable sources, such as vegetable and animal oils, as well as from wastes, such as used cooking oil. Currently, there is a considerable effort to improve the efficiency of the transesterification reaction used to convert these oils to biodiesel. We are examining the ability of Raman spectroscopy to 1) characterize the reactant oils, 2) monitor and control the reaction, and 3) monitor and control product separation. This poster will present our preliminary results.

8. **William M. Leahy, Director, Institute for Sustainable Energy, Eastern CT State University, 83 Windham St., Willimantic, CT 06226, tel. no. 860-465-0254, E-mail: [LeahyW@easternct.edu](mailto:LeahyW@easternct.edu)**

**Poster Title: "12 Steps to a Sustainable Campus & BioHeat Demonstration Project at ECSU".**

**Poster abstract:** The Institute for Sustainable Energy (ISE) at Eastern Connecticut State University (ECSU) has developed an effective approach to sustainability on the colleges and universities campuses of Connecticut. The Institute is providing guidelines and support to Connecticut schools interested in taking a comprehensive approach to lowering energy use and cost, reducing greenhouse gases from building systems and transportation, improving water and waste water management, encouraging recycling, hazardous waste reduction and disposal, and environmentally friendly materials procurement. The Institute's guidelines call for a team-based approach engaging administrative staff, students, faculty and local technical experts.

In addition; The Connecticut Department of Environmental Protection (CT DEP) identified the south campus boiler house at Eastern Connecticut State University as an acceptable site for a demonstration projects of BioHeat. Assisted by the Institute for Sustainable Energy, ECSU received a grant to conduct a BioHeat Pilot Fuel Switching Project as specified in the *2005 Connecticut Climate Change Action Plan*. The south campus boiler house has an eleven year old 100 HP dual fuel Kewanee fire tube steam generator that provided heat and domestic hot water to a classroom building (Shafer Hall) and a residence hall (Burr Hall) on the Eastern's campus. The grant covered the costs of the boiler and site preparation, boiler tune-ups, tank cleaning, and emissions and PAH testing. The grant also covered the cost of the B100 biodiesel fuel mixed with #2 low sulfur fuel oil to test the operational pros and cons and emissions from burning 14,000 gallons of B 20 as a heating fuel.