

## NEWS

### **U.S. Senate Shows Support for Military Biofuel Investments**

The U.S. Senate blocked legislature that would have blocked the U.S. Department of Defense (DOD) from purchasing biofuels if they cost more than conventional petroleum fuels. The DOD, an avid supporter of development of domestic sustainable fuel sources, may place investments in start-up companies and research endeavors focusing on biofuels. Senator Mark Udall (D-CO) sees this as an opportunity for biofuels to become cost competitive with traditional fuel sources, stating "DOD investment has caused the price to drop dramatically over the past two years."

[More Information](#)

### **BBRL Fungal Pretreatment Research Featured on American Chemistry Society (ACS) Press Release**

The pretreatment of lignocellulosic biomass with a white rot fungus show promise to increase sugar availability for ethanol fermentation. See the link below for more information.

[More information](#)

### **BBRL and Touchstone Research Laboratory (TRL) Featured on PBS**

The Public Broadcasting Service (PBS) television program Our Ohio featured the algae research project being conducted by BBRL and TRL. See the YouTube link below for more information. The collaborative project is funded by the U.S. Department of Energy (DOE).

[Video Link](#)

## NEW GRADUATE STUDENTS IN 2012



**Johnathon (John) Sheets** – Mr. John Sheets joined Dr. Li's group as a new graduate student in January, 2012. He received his Bachelors of Science in Engineering Management (Environmental Engineering focus) from Miami University in Oxford, Ohio. John joined BBRL after working in the environmental industry in his hometown of Columbus, Ohio. His

current research involves the scale up of algae cultivation systems for the remediation of wastewater and production of biomass for biofuels.

**Ratanachat (Siam) Racharaks** – Mr. Siam Racharaks is a new graduate student from Akron, Ohio. He received his Bachelors of Science in Biological Engineering from the Department of Food, Agricultural and Biological Engineering at Ohio State. Siam received the prestigious University Fellowship and Food, Agricultural and Environmental Sciences (FAES)



Graduate Research Fellowship. Siam's research focuses on the utilization of industrial wastewater for algae production.

**Xinjie Tong** – Ms. Xinjie Tong is a new graduate student from South China University of Science and Technology where she received her Bachelors of Science in Biological Engineering. Xinjie's research is focused on the production of biopolymers from renewable sources via thermochemical conversion.



**Juliana Vasco** – Ms. Juliana Vasco Correa is a new graduate student from Columbia where she received her Masters of Science in Biological Engineering. Juliana's research interests include the biological conversion of biomass to biofuels and bioenergy.

## ALUMNI NEWS

**Zhifang Cui, Ph.D.**, is currently performing research with Dr. Jing Liu in the Biotechnology Department at Lund University. She is studying the process control and optimization of anaerobic digestion.

**Jian Shi, Ph.D.**, is currently employed as a process engineer at Sandia National Laboratories. He is researching the fractionation of cellulosic biomass and scale up of biofuel technologies.

**Caixia (Ellen) Wan, Ph.D.**, is currently employed at Fudan University, China as a faculty member.

## LOOKING BACK AT 2012: BBRL ACHIEVEMENTS

### Graduations

**Dan Brown, M.S.** Comparison of solid-state to liquid phase anaerobic digestion of lignocellulosic biomass for biogas production (Currently employed by The Dannon Company)

**Ting Cai, M.S.** Cultivation of *Nannochloropsis salina* and *Synechocystis* sp. PCC6803 in anaerobic digestion effluent for nutrient removal and lipid production (Currently enrolled in the Rutgers University Ph.D. program)

### *Upcoming events, deadlines, and grants*

Dec. 13, 2012 – ASABE abstracts due  
 Jan. 18, 2013 – Ray Travel applications due  
 Jan. 25, 2013 – Graduate applications due  
 Feb. 6, 2013 – SEEDS student applications due  
 Feb. 15, 2013 – ABBB abstracts due  
 Mar. 1, 2013 – Hayes Graduate Research Forum

**Phil Cherosky, M.S.** Anaerobic digestion of yard waste and biogas purification by removal of hydrogen sulfide (Currently employed by the Ohio Environmental Protection Agency)

### Peer Reviewed Journal Publications (14)

Brown, D., Li, Y. B. 2012. Solid state anaerobic co-digestion of yard waste and food waste for biogas production. *Bioresource Technology*. 127:275-280. **IF: 4.98**

Brown, D., Shi, J., Li, Y. B. 2012. Comparison of solid-state to liquid anaerobic digestion of lignocellulosic feedstocks for biogas production. *Bioresource Technology* 124:379-386. **IF: 4.98**

Cai, T, Park S, Li, Y. B. 2013. Nutrient recovery from wastewater streams by microalgae: status and prospects. *Sustainable and Renewable Energy Reviews. In press.* **IF: 6.02**

Cherosky P., Li, Y. B. 2013. Hydrogen sulfide removal from biogas by bio-based iron sponge. *Biosystems Engineering* 114:55-59. **IF: 1.35**

Cui, F., Li, Y. B. 2012. Co-production of lactic acid and *Lactobacillus rhamnosus* cells from whey permeate with nutrient supplements. *Food and Bioprocess Technology*. 5(4): 1278-1286. **IF: 3.70**

Cui, Z.F, Shi, J., Wan, C, X., Li, Y. B. 2012. Comparison of alkaline- and fungi- assisted wet-storage of corn stover. *Bioresource Technology*. 109:98-104. **IF: 4.98**

Cui, Z. F., Wan, C. X., Sykes, R., Shi, J., Li, Y. B. 2012. Enzymatic digestibility of corn stover fractions in response to fungal pretreatment. *Industrial & Engineering Chemistry* 51:7153-7159. **IF: 2.24**

Hu, S. J., Luo, X. L., Wan, C. X., Li, Y. B. 2012. Characterization of Crude Glycerol from Biodiesel Plants. *Journal of Agricultural and Food Chemistry* 60:5915-5921. **IF: 2.82**

Hu, S. J., Wan, C. X., Li, Y. B. 2012. Production and characterization of biopolyols and polyurethane foams from crude glycerol based liquefaction of soybean straw. *Bioresource Technology*. 103(1):227-233. **IF: 4.98**

Liew L., Shi, J., Li, Y. B. 2012. Methane production from solid-state anaerobic digestion of lignocellulosic biomass. *Biomass and Bioenergy* 46:125-132. **IF: 3.65**

Park, S., Li, Y. B. 2012. Evaluation of methane production and macronutrient degradation in the anaerobic co-digestion of algae biomass residue and lipid waste. *Bioresource Technology*. 111:42-48. **IF: 4.98**

Wan, C., Li, Y. B. 2012. Fungal pretreatment of lignocellulosic biomass. *Biotechnology Advances*. 30: 1447-1457. **IF: 10.96**

Xu, F. Q., Li, Y. B. 2012. Solid-state co-digestion of expired dog food and corn stover for methane production. *Bioresource Technology* 118:219-226. **IF: 4.98**

Xu, F. Q., Shi, J., Lv, W., Yu, Z. T., Li, Y. B. 2013. Comparison of Different Anaerobic Digestion Effluents as Inoculum and Nitrogen Sources for Solid-State Anaerobic Digestion of Corn Stover. *Waste Management* 33:26-32. **IF: 4.98**

### Research Grants (7 grants in total of \$7,426,307)

Li, Y. B, Lal, R., Shearer, S., Bakshi, B., Yu, Z. T., Hall, D., Halene, C., Yu, F., Mani, S. Bioenergy and Biofuels Production from Lignocellulosic Biomass via Anaerobic Digestion and Fisher-Tropsch Reaction, *USDA-DOE Biomass Research and Development Initiatives (BRDI) program*, \$6,510,183. 2012-2015.

Li, Y. B , Buchheit, R. G., Bakshi B. Development and demonstration of a low VOC polyurethane coating system using biopolyols derived from crude glycerol. *USD NIFA Critical Agricultural Materials Program*. \$418,965. 1/2012-12/2013.

Li, Y. B. Characterization and Refining of Crude Glycerin Based Biopolyols. *Bio100 Technologies LLC*. \$ 300,000. 1/2012-07/2013

Li, Y. B. Bioenergy and Biofuels Production from Lignocellulosic Biomass via Anaerobic Digestion and Fisher-Tropsch Reaction, *OARDC Seeds Agency Matching*, \$25,000. 2012-2015.

Li, Y. B. Development and demonstration of a low VOC polyurethane coating system using biopolyols derived from crude glycerol. *OARDC Seeds Agency Matching*, \$25,000. 2012-2015. 1/2012-12/2013.

Li, Y. B. Characterization of complicated waste streams and bioproducts. *OARDC Equipment Program*. \$87,159 03/2012-12/2012.

Li, Y. B. Crude glycerol based polyols research. *Bio100 Technologies LLC*, \$60,0000. 1/2012-12/2012.

### OARDC SEEDS Student Grants ( 4)

**Shengjun Hu** (2012, Doctoral) - Identifying Roles of Impurities in Crude-Glycerin-Based Biopolyols and Polyurethane Foams Production

**Stephen Park** (2011, Doctoral) - An Integrated System for Biofuel Production from Anaerobic Digestion and Microalgal Growth

**Johnathon Sheets** (2012 – Master's) - Conversion of Algae Biomass Residue to Bio-oils for Bio-resin Production via Hydrothermal Liquefaction

**Fuqing Xu** (2012, Doctoral) - Evaluation of an integrated anaerobic digestion system (iADs) for biogas production and solid and pathogen reduction for manure

## Awards and Fellowships (7)

**Shengjun Hu** - 2012 Energy Research Poster Session innovation Award, The University Clean Energy Alliance of Ohio

**Yebo Li** - 2012 ASABE Rain Bird Engineering Concept of the Year Award

**Yebo Li** - 2012 Early Career Award from Association of Overseas Chinese Agricultural, Biological and Food Engineers (AOCABFE)

**Xiaolan Luo** - 2012 OARDC Annual Meeting Poster Competition, Third Place- Postdoc Category

**Stephen Park** - 2012 OARDC Charles E. Thorne Memorial Associateship Award

**Ratanachat (Siam) Racharaks** - 2012 FAES Environmental Graduate Research Fellowship, 2012 OSU Graduate School Fellowship

**Jian Shi** - 2012 OARDC Annual Meeting Poster Competition, First Place- Research Associate Category

## Conference Presentations (18)

Brown, D., Li, Y. B. 2012. Evaluation of different lignocellulosic biomass feedstocks for biogas production via solid state anaerobic digestion. Joint Technical Conference and Annual General Meeting of CSBE & NABEC. Orillia, ON. (July 15-18)

Cai, T, Li, Y. B. 2012. Cultivation of lipid-rich microalgae *Nannochloropsis salina* in anaerobic digestion effluent for biofuel production. UCEAO 6th Annual Conference. Columbus, OH. (April 2-3)

Cai, T., Li, Y. B. 2012. Cultivation of microalgae *Nannochloropsis salina* in anaerobic digestion effluent for nutrient removal and lipid production. OARDC Annual Conference. Wooster, OH (April 26)

Cai, T, Li, Y. B. 2012. Cultivation of lipid-rich microalgae *Nannochloropsis salina* in anaerobic digestion effluent for biofuel production. 2nd International Conference on Algal Biomass, Biofuels, & Bioproducts. 2012. San Diego, CA (June 10-13).

Cai, T., Li, Y. B. 2012. Cultivation of lipid-rich microalgae *Nannochloropsis salina* in anaerobic digestion effluent for biofuel production. 2012 ASABE Annual International Meeting. Dallas, TX. (July 30-Aug.1)

Cherosky, P., Li, Y. B. 2012. Biogas purification by removal of hydrogen sulfide. OARDC Annual Conference. Wooster, OH (April 26)

Hu, S. J., Li, Y. B. 2012. Production and characterization of biopolyols and polyurethane foams from crude glycerol based

liquefaction of soybean straw. UCEAO 6th Annual Conference. Columbus, OH. (April 2-3)

Hu, S. J., Li, Y. B. 2012. Polyols and polyurethane foams from crude glyderol and lignocellulosic biomass. OARDC Annual Conference. Wooster, OH (April 26)

Hu, S. J., Li, Y. B. 2012. Polyols and polyurethane foams from crude glycerol-based liquefaction of lignocellulosic biomass: effects of crude glycerol impurities on product properties. AIChE Annual Meeting. Pittsburgh, PA. (Oct 29-Nov 2)

Li, Y. B. 2012. Production of biopolyols and polyurethanes from lignocellulosic biomass and crude glycerin. USDA S-1041 Annual Symposium. Washington, DC. (August 7)

Li, Y. B., S. Pryor, W. Liao, B. He, A. Shahbazi, L. J. Wang, A. Christy, F. Michel, T. Ezeji. 2012. Biobased energy educational material exchange system (BEEMS). USDA S-1041 Annual Symposium. Washington, DC. (August 7)

Luo, X., Li, Y. B. 2012. Production and characterization of biopolyols from crude glycerol. OARDC Annual Conference. Wooster, OH (April 26)

Park, S., Li, Y. B. 2012. Synergetic anaerobic digestion of algae biomass residue and lipid waste. OARDC Annual Conference. Wooster, OH (April 26)

Park, S., Li, Y. B. 2012. An integrated computational fluid dynamics model to simulate the productivity of industrial scale algae raceway ponds. AIChE Annual Meeting. Pittsburgh, PA. (Oct 29-Nov 2)

Shi, J., Li, Y. B. 2012. Biogas production and microbial community dynamics in 'healthy and sour' reactors during solid-state anaerobic digestion of corn stover. OARDC Annual Conference. Wooster, OH (April 26)

Wang, Z. J., Li, Y. B. 2012. Reactor performance and microbial community dynamics during solid-state anaerobic digestion of corn stover at mesophilic and thermophilic conditions. OARDC Annual Conference. Wooster, OH (April 26)

Wang, Z. J., Shi, J., Li, Y. B. 2012. Effect of leachate recirculation on the solid state anaerobic digestion of corn stover. 2012 ASABE Annual International Meeting. Dallas, TX. (July 30-Aug.1).

Xu, F. Q., Li, Y. B. 2012. Solid-state co-digestion of expired dog food and corn stover for methane production. UCEAO 6th Annual Conference. Columbus, OH. (April 2-3)

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