SIU Energy Day Program

April 6, 2016

Thank you for attending SIU Energy Day!

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Agenda/Biographies
9:00 a.m. Student Center Auditorium opens, coffee & Expo @ International Lounge (poster displays, etc. in lounge)

9:30 a.m. Welcome (Auditorium)

9:45 a.m. Morning Keynote (Auditorium)

Peter B. Littlewood, Director of Argonne National Laboratories - He is the Director of Argonne National Laboratory, one of the nation’s largest science and engineering research centers, and a Professor of Physics in the James Franck Institute at the University of Chicago. Dr. Littlewood holds a bachelor's degree in Natural Sciences (Physics) and a Ph.D. in Physics, both from the University of Cambridge. The University of Chicago has led Argonne’s operations since before the laboratory was formally chartered in 1946.

10:30 a.m. Break, Expo @ International Lounge (poster displays, etc. in lounge)

10:45 a.m. Expert Panel Discussion: Carbon Dioxide Utilization - Research and Market Opportunities (Auditorium).

Moderator: Norm Peterson, Director of Government Relations, Argonne National Laboratories

Panelists:

Tomasz Wiltowski, Director, Advanced Coal and Energy Research Center - He received his M.Sc. in chemical engineering from Technical University, Cracow, Poland in 1974 and Ph.D. in catalysis
from the Institute of Catalysis and Surface Chemistry, Polish Academy of Sciences in 1984. At present, he is Professor at the Department of Mechanical Engineering and Energy Processes, Director of the Advanced Coal and Energy Research Center, and Interim Director of the Materials Technology Center of Southern Illinois University at Carbondale, Illinois. His special interest includes coal and biomass gasification, hydrogen production, Fisher-Tropsch synthesis of liquid fuels, and heterogeneous catalysis.

Kevin O'Brien, Director, Illinois Sustainable Technology Center - He is the Director of the Illinois Sustainable Technology Center. O'Brien's energy expertise encompasses both the supply side and demand side. He is experienced with projects involving both renewable energy as well as traditional fossil based fuels. His focus in renewables has been on the development of utility scale solar projects. He received a B.S. in Polymer Engineering from Case Western Reserve University, his M.S.in Macromolecular Engineering from Case Western Reserve University and his Ph.D. in Macromolecular Engineering, Case Western Reserve University (Ohio).

John Caupert, Director, National Corn-to-Ethanol Research Center - He is the Executive Director of the National Corn-to-Ethanol Research Center in Edwardsville on the SIU Edwardsville Campus. He holds a bachelors degree in Agribusiness Economics and a Masters degree in Agriculture Economics – Agriculture Policy from SIU Carbondale, IL. As Executive Director of NCERC, John oversees funding and financial management of an annual budget exceeding $3,500,000, develops, implements and manages budgets, business development plans, and strategic plans, develops new programs for training and internships, manages and expands collaborative relationships with the US DOE, DOL, Department of Agriculture and corporate partners, and handles day to day operations of NCERC.

12:00 p.m. Lunch @ Old Main Room and Lounge for registered attendees - Energy Boost Scholarships and Grants awarded; Expo @ International Lounge continues

1:00 p.m. Afternoon Keynote (Auditorium)

Christopher Smith, Assistant Secretary of Fossil Energy, US DOE – He serves as Assistant Secretary for Fossil Energy at the U. S. Department of Energy. As Assistant Secretary, Smith leads the Department of Energy’s Office of Fossil Energy, including scientists and engineers working at eleven sites across the United States. In this capacity, he oversees the Department’s fossil energy research and development program (coal, oil and natural gas) and the National Energy Technology Laboratory. He is also responsible for the U.S. Petroleum Reserves, the largest strategic petroleum stockpile in the world. Smith holds a bachelor's degree in Engineering Management from the United States Military Academy at West Point and an MBA from Cambridge University.

Sponsored by Paul Simon Public Policy Institute, http://www.paulsimoninstitute.org

1:45 p.m. Break, Expo @ International Lounge (poster displays, etc. in lounge)
2:00-3:15 p.m. Select SIU Carbondale Campus Lab Tours and Demos – Walking. Please meet in the International Lounge area. First tour will leave from Student Center International Lounge at 2:00 p.m. Subsequent groups will leave every 15 minutes.

Kyle Plunkett, Associate Professor, Dept. of Chemistry and Biochemistry
Neckers 303 - Synthesis of Organic Electronic Materials

Yanna Liang, Associate Professor, Dept. of Civil & Environmental Engineering
Engineering B35 - Biochemical and Thermostermal Platforms for Producing Biofuels from Various Feedstocks

Kanchan Mondal, Professor, Dept. of Mechanical and Engineering and Energy Processes
Engineering B109 - Low CO2 Emissions-based Technologies

Tomasz Wiltowski, Director of Advanced Coal and Energy Research Center Engineering E40 - Fischer-Tropsch, Bioenergy and Coal Gasification

Map of Neckers (just south of Student Center):

![Map of Neckers](acerc.siu.edu)

Map of Engineering (just south of Neckers):

![Map of Engineering](acerc.siu.edu)
3:30-4:30 p.m. Illinois Energy Development Park (Carterville) - Tour by shuttle bus, returning to Student Center

6:00-7:00 p.m. Prof. Leon Shaw, Professor of Materials Engineering and Director of the Center for Energy Storage and Conversion at the Illinois Institute of Technology, will present a seminar entitled "Mechanical-Activation-Enhanced Surface Functionalization and Capacitance for High-Performance Li-ion Capacitors" (Auditorium) - Sponsored by SIU Materials Technology Center

Energy Boost Scholarship Awardees Fall 2016
Congratulations to the first-ever Energy Boost Scholarship awardees! More information about awardees will be available on the ACERC website.

Graduate Scholarships

These scholarships aim to support high caliber students in SIU's PSM Energy Program. These students will be entering SIU’s PSM Energy program in the fall of 2016.

Tajdar Ahmed
Joining SIU from Jawaharlal Nehru Technological University, India
Undergraduate Scholarships

These scholarships aim to attract local high school graduates who have been personally impacted by the contraction in the coal industry towards an alternative path. Where previously a job in the coal mines may have been the expected path, an undergraduate degree in Mechanical Engineering and Energy Processes can open doors to new options in advanced coal and energy.

Evan Langley
Joining SIU from Lakeland College, Matoon, IL

Jake Wagner
Joining SIU from Waterloo High School, Waterloo, IL

Energy Boost Seed Grant Awardees FY 17

Vibration Energy Harvesting Devices for Simultaneously Powering Multiple Electrical Loads
Dr. Christopher Cooley, Assistant Professor, Mechanical Engineering and Energy Processes – PI
Dr. Tan Chai, Assistant Professor, Mechanical Engineering and Energy Processes - CoPI
Dr. Tsuchin Chu, Professor, Mechanical Engineering and Energy Processes - CoPI

Hybrid Porous Materials relevant for Selective Capture and Catalytic and Electrocatalytic Conversion of greenhouse Gases to Chemical Fuels
Dr. Pravas Deria, Assistant Professor, Chemistry and Biochemistry – PI
Dr. Qingfeng Ge, Professor, Chemistry and Biochemistry – CoPI

Exploring Electrochemically assisted Methane Production from Coal by Microbial Electrolysis Cell Systems
Dr. Mohtashim Shamsi, Assistant Professor, Chemistry and Biochemistry – PI
Dr. Yanna Liang, Professor, Civil and Environmental Engineering, Co-PI

Expo Participants

In alphabetical order by department or program name. “Friends of ACERC” (below – after SIU departments and programs) are external to SIU but no less important to the local science/energy community.

SIU Departments and Programs

Advanced Coal and Energy Research Center

http://acerc.siu.edu

Energy Boost Grants, Scholarships and Partnership Programs
Students interested in energy careers and faculty looking for energy research grants are encouraged to come learn more about Energy Boost Grants and Scholarships. Also, information about the new Energy Boost Corporate Partnerships will be available.

Civil & Environmental Engineering

Zheting Bi – Post-Doctoral Fellow

*An integrated platform for producing biofuels from sweet sorghum bagasse*

Biofuel has been considered as one of the solutions addressing world energy crisis and environmental catastrophe caused by excessive addiction to fossil fuels. Although biofuel possesses numbers of superiorities that would benefit the environment, except ethanol, it is still not a commercial reality due to its high production cost. Based on this motivation and market demand, a straightforward and highly efficient process was developed to produce biodiesel from an oleaginous yeast strain, Cryptococcus curvatus, grown on hydrolysates of sweet sorghum bagasse. A 92.0% of lipid conversion rate was achieved under optimal conditions. However, two by-products of this process, yeast cell residues after transesterification (YR) and the washed solid after pretreatment (WS), were left unused. To utilize these two by-products and improve the overall efficiency and energy balance from sorghum bagasse to biofuel, we have been investigating the feasibility of converting these two wet biomass materials to bio-oil through hydrothermal liquefaction (HTL). Results from this study in terms of carbon balance and yield of bio-oil obtained from using different catalysts and different temperatures will be presented. In addition, characteristics of the top three bio-oil samples regarding energy content, composition and viscosity will be reported. Finally, results from a preliminary techno-economic analysis will be presented, too.

Civil and Environmental Engineering

Ji Zhang – Graduate Doctorate

*Optimizing microbial coal conversion to methane for ex situ applications*

To optimize methane production from bituminous coal, a total of 12 parameters were first evaluated by setting up 64 reactors following a 2-level factorial design. Among the 12, temperature, coal loading, particle size and ethanol were found to be statistically significant. To identify optimal value for each factor, a box-behnken design necessitating 29 reactors was adopted. Optimal conditions for the highest methane yield were: temperature, 32oC; coal loading, 201.98 g/L; coal particle size, < 73.99 um; and ethanol at 300 mM. Under these optimum conditions, the predicted methane yield and content was 2,957.4 ft³/ton and 74.2%, respectively. These predicted values matched those obtained from a verification experiment where a methane yield of 2,900 ft³/ton with a methane content of 70% was observed. It needs to be noted that negligible methane was released from coal when the initial ethanol concentration was 300 mM. The highest methane yield was detected when ethanol at 100 mM was added three times to coal reactors. The exact function of ethanol in coal biogasification needs to be further investigated.

Microbiology
John Lindt – Energy Boost Scholar

Soybean Rare Earth Metal Absorbance on Fly-Ash

Fly ash-a coal refinement byproduct- contains rare earth metals. Soybeans have the capability to absorb such toxins into a concentrated region. The purpose of this study is to determine the location of rare earth metal concentrations, determine the most efficient fly-ash soil concentrations, and to determine the soybean strain most apt at rare earth metal absorption.

Plant Soil & Agricultural Systems

David Lightfoot – Professor, Plant, Soil, and Agricultural Systems

Alleles underlying increased soybean oil for biodiesel

Previously an unusual allele of Kas1 was discovered in rare germplasm. Here we present a genomic analysis and show how soy oil for biodiesel will be improved.

Office of Information Technology

http://oit.siu.edu/

Information Technology Is Changing the Future of Energy

The energy and utilities industries enjoy a unique position: both provide a product/service that is essential to the well-being of its customers and to the world economy. Nonetheless, these industries are under growing scrutiny to provide service with the least environmental impact possible. Information technology (IT) is now intrinsic to the energy and utility sectors. IT is the tool that has allowed these industries to provide for global need, meet environmental requirements, and remain financially viable.

Professional Science Masters in Advanced Energy and Fuels Management

http://psmenergy.siu.edu

Come Learn More about the SIU PSM Energy

The Professional Science Master’s (PSM) in Advanced Energy and Fuels Management is a 36-hour post-graduate degree that combines graduate level technical training in energy resources and technology with opportunities for the development of workplace skills. This intensive program is designed to prepare graduates for leadership positions in the energy industry. The program includes nine (9) business-related credit hours, nine (9) science/technology-related credit hours, three (3) credit hours in energy policy studies, nine (9) credit hours of graduate level electives, and a six (6) credit hour capstone internship completed with an industrial partner.

Sustainability Office

http://sustainability.siu.edu/
Energy and Green Fee Funded Projects at SIU

This presentation shares energy impact at SIU, as well as Green Fee Funded Projects related to energy. Learn about where we are and think about what you can do to impact future energy usage at SIU!

Friends of ACERC

Advanced Energy Solutions Group, Inc.

http://aessolar.com/

(AES Solar) of southern Illinois, A Design/Build electrical contractor specializing since 1999 in the design and installation of solar electric systems across the Midwest. AES Solar offers a large selection of services such as;

- Finding the right renewable energy solutions for your home, business, or institution.
- Being a Design/Build Electrical Contractor installing customized solar electric, solar thermal, and wind systems.
- We specialize in complete off grid system design and installation.
- Personal help by phone for all of your technical renewable energy questions.
- Mobile solar education classes.

We are the only local design and build solar installer and we have been doing it since 1999. Never would have imagined 17 years flying by so fast. Do you want us to Get YOU Energized with Renewable Energy? We are licensed, bonded, NABCEP certified and insured. Call 618-893-1717. Living on Earth includes a FREE trip around the Sun every year!

Science Center of Southern Illinois

http://yoursciencecenter.org/

The Science Center of Southern Illinois was founded more than 20 years ago with the goal of encouraging children to develop their natural curiosity and exploration through hands-on experience. We host more than 50 exhibits and see more than 50,000 visitors annually. Our most recent exhibit addition is a 600ft pneumatic ball launch system. The Science Center is a recognized 501(c)3 Not-for-Profit organization and is made possible by the generous contributions of our community members.
Survey – Please Submit to Registration Table

SIU Energy Day – April 6, 2016

Please take a couple of minutes to complete this survey form. Your comments will be kept confidential and will help improve future SIU Energy Days. You can leave this with the registration table at the event campus mail to MC 4623 or email to acerc@siu.edu.

Name (optional):

1. Overall, were you satisfied or dissatisfied with SIU Energy Day? Please provide explanation.

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________________________________________________________________________________

2. How did you hear about SIU Energy Day?

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3. What would you recommend to improve the next SIU Energy Day?

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4. What were your greatest take-aways from the event? What did you learn, gain, benefit from, etc.

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5. Please add any additional comments or suggestions.

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