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The Hefley Professor in Logistics and Entrepreneurship

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Date: Friday, Oct., 8, 2021

Time: 1 - 1:50 pm

Zoom Meeting ID: 970 7656 5407

Password: 477211

Analytical Models for Optimal Process Design in an Integrated Biorefinery

Abstract: Energy plays a vital role in our daily lives as it used for transportation and the power system. About 80% of the energy used in the USA today is generated using non-renewable sources. In the last decade, generation of renewable energy has increased, however, there still are opportunities to reduce costs and increase production. The focus of this research is to improve the operations of bioenergy generation systems. This research is motivated by the inefficiencies observed in bulk solids handling, and material flows through biomass processing systems. These inefficiencies are due to the stochastic nature of biomass characteristics (such as moisture, carbohydrate, and ash contents), and cause low utilization efficiency of the reactor. We propose a stochastic optimization model that identifies a process design, inventory level and operating conditions of equipment to ensure a continuous feeding and high utilization of the reactor. The models are developed using historical data from Idaho National Laboratory, process development unit (PDU), which is a full-size, fully integrated, feedstock preprocessing system. The outcomes of this research are currently being evaluated via experimentation at the PDU. The proposed system is expected to reduce processing time by 20.5% to 30.2% and reduce the maximum inventory 3 to 4 times as compared to current practices of PDU.

Biography: Dr. Sandra D. Eksioglu is the John M. and Marie G. Hefley Professor in Logistics and Entrepreneurship in the Department of Industrial Engineering, University of Arkansas. Dr. Eksioglu's expertise is in the areas of operations research, network optimization, and algorithmic development. She uses these tools to develop models and solution algorithms for solving large-scale problems that arise in the areas of supply chain, energy systems and health care. Dr. Eksioglu has over 50 refereed journal publications, co-edited a book, co-authored a textbook, and presented her research in several national and international conferences. Her research has been funded by the National Science Foundation, the US Department of Energy, the US Department of Transportation, etc. She is an active member of ASEE, IISE and INFORMS.