Covestro Lectureship in Sustainability
9:45 a.m. Tuesday, October 13, 2015
331 Smith Hall

Professor

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Rewiring Metabolism

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Abstract

The key metabolic pathways, the enzymes involved, and their reaction mechanisms were largely elucidated through a collection of efforts in the 20th century. Since then, metabolism has often been neglected as a field of solved problem attracting little attention. With the growing understanding of biochemical functions of the cells and the organisms, time is ripe for re-thinking and re-designing the metabolic pathways to solve problems in energy and medicine.

These two seemingly unrelated fields are surprisingly linked at the level of metabolism. Efficient energy metabolism is both crucial to the biological production of fuels as well as managing obesity, cancer metabolism, and brain function. In this talk, we will first discuss how fundamental metabolic pathways can be re-designed to afford efficient biofuel production. We will then show how a synthetic (non-natural) metabolic pathway introduced in mice was able to resist diet-induced obesity. Such strategies in metabolic rewiring may open a new frontier in medical research as well as energy production.

James C. Liao is the Ralph M. Parsons Foundation professor and chair of the Department of Chemical and Biomolecular Engineering at the University of California, Los Angeles (UCLA). He received his Bachelor of Science degree from National Taiwan University, and his doctorate from the University of Wisconsin-Madison. He is an expert in metabolic engineering, systems biology, and synthetic biology. After working as a research scientist at Eastman Kodak Company, Rochester, NY, he started his academic career at Texas A&M University in 1990 and moved to UCLA in 1997. Professor Liao was elected a Fellow of American Institute for Medical and Biological Engineering, 2002, and has received numerous awards, including National Science Foundation Young Investigator Award (1992), Merck Award for Metabolic Engineering (2006), Food, Pharmaceutical, and Bioengineering Division award of American Institute of Chemical Engineers (AIChE) (2006), Charles Thom Award of the Society for Industrial Microbiology (2008), Marvin Johnson Award of American Chemical Society (2009), Alpha Chi Sigma Award of AIChE (2009), James E. Bailey Award of Society for Biological Engineering (2009), and Presidential Green Chemistry Challenge Award (2010). In 2012, he was honored as Champion of Change in renewable energy by the White House. In 2013, he received the Eni award for renewable energy. Liao is a member of National Academy of Engineering (2013), Academia Sinica in Taiwan (2014), and National Academy of Sciences (2015).

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Refreshments will be served prior to the seminar.