

Public Lecture

Departments of Chemistry and Chemical Engineering & Materials Science

Covestro Lectureship in Sustainability

7 p.m. Tuesday, Oct. 13, 100 Bell Museum

Fueling the Future: Microbial Engineering for Production of Sustainable Biofuels

Our challenge: Going beyond the current status of biofuel production. Professor James C. Liao, a leading scientist in the field of biochemical methods, examines this challenge at a Covestro Lectureship in Sustainability:

7 p.m. Tuesday, October 13, Bell Museum Auditorium. Free and open to the public*.

Register Online: <http://z.umn.edu/covestrolecture>

Global climate change linked to greenhouse gas accumulation has caused concerns on the use of fossil fuel as the major energy source. CO₂ fixation followed by fuel synthesis is an important approach to mitigate climate change while keeping energy supply sustainable.

Despite commercialization of the first generation biofuel and the fledgling cellulosic ethanol plants, biofuel production still faces significant competition from conventional fossil fuels. In addition, life-cycle greenhouse gas saving and indirect land use change are still areas of concerns.

Next-generation biological production of fuels must consider use of lignocellulose from wastes and energy crops, direct CO₂ conversion using microalgae or lithoautotrophs driven by solar electricity, and methane from landfill or natural gas wells that would otherwise be flared. To achieve high yield high throughput production at scale using diverse substrates to produce various fuels, engineering of enzymes, fuel pathways, and central metabolism are essential.

While success examples in small scales have emerged, the field still awaits major breakthroughs in all areas to go beyond the current status of biofuel 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).