

## **Biotechnology for the Sustainable Production of Fuels and Chemicals**

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Abstract: Our dependence on petroleum for the production of fuels and chemicals is a formidable challenge to the global environment. Recent technological developments in metabolic engineering and synthetic biology have given us unprecedented capabilities to manipulate and re-design microorganisms for the production of advanced biofuels and green chemicals from renewable sources. This talk will focus on some of these emerging technologies, such as: (1) subcellular engineering, which targets intracellular compartments to take advantage of their distinct environments, physical separations, and repertoires of metabolites and enzymes; and (2) development of metabolic biosensors to screen, select or control engineered cells, which will greatly accelerate strain development, and enable the engineering of new cellular control properties.

The talk will also discuss how microbial engineering can greatly benefit from structural biology and protein engineering to develop novel enzymes, transporters and regulatory proteins. The combination of well-established methods of metabolic engineering, biochemistry and biophysics with new and evolving technologies in synthetic biology, including development of synthetic organelles, metabolic biosensors, and genetic circuits, will be key to fulfill the promise of biotechnology to develop renewable transportation fuels, and chemicals.