College of Engineering

Department of Mechanical & Industrial Engineering

3:00-4:00pm, Friday, January 27th, 2023

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by Arul Mozhy Varman

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Our group is mainly focused on the metabolic engineering of microbial cell factories as ell as utili!ing systems and synthetic biology approaches for the sustainable production of biofuels, pharmaceuticals, and "alue-added chemicals# $he metabolic path ays in microbes are "ery complicated, consisting of thousands of highly regulated reactions# $herefore, e"en minimal engineering of a microbe's metabolic path ay ithout considering its systems le"el impact imposes burden on the cell physiology and may offset its benefit to bioproduction# $hese burdens arise due to cofactor imbalance, metabolic imbalance, or due to the redirection of &ey intermediates# 'erein, ^{13})-fingerprinting e*periments can be used to rigorously map the intracellular net or& ithin microbes and to thro light on their cellular metabolism# Feeding microbial cell factories ith ^{13})-labeled substrates results in uni+ue isotopic patterns amongst the cellular metabolites ,isotopic fingerprints-, hich can pro"ide functional characteri!ation of metabolic path ays# .n addition, ^{13})-metabolic flu* analysis ,^{13})-/F0- hich deri"es its constraints from ^{13})-fingerprinting can be employed to +uantify carbon and energy ,0$1, 203' and 2031'- flu*es through the central metabolism# .n this presentation, . ill discuss the metabolic path ay engineering applications of ^{13})-fingerprinting mainly in the conte*t of lignin "alori!ation,)O_2 recycling, and biofuel production#

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