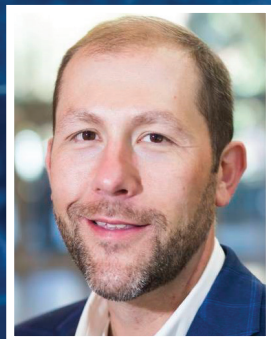




DEPARTMENTAL SEMINAR



JAMEY YOUNG

Vanderbilt University

Monday, March 9, 2020 | 10:00 AM

366 Colburn Lab

Dr. Jamey D. Young is a Professor of Chemical and Biomolecular Engineering (ChBE) and Molecular Physiology and Biophysics (MPB) at Vanderbilt University. The overall goal of his lab is to develop novel engineering approaches to measure, understand, and control cellular metabolism. He received a B.S. degree from the University of Kentucky (1999) and a Ph.D. from Purdue University (2005), both in Chemical Engineering. Dr. Young continued his training at MIT as an NIH Ruth L. Kirschstein postdoctoral fellow from 2005-08. He was awarded the NSF CAREER Award in 2010, the DOE Early Career Award in 2012, and he was named a Vanderbilt Chancellor's Faculty Fellow in 2017. He is also the Director of the Chemical Engineering Graduate Program at Vanderbilt, and received the Excellence in Teaching Award from the ChBE department in 2018. Dr. Young has authored over 65 articles and book chapters describing the application of metabolic flux analysis and mathematical modeling to investigate research questions of relevance to medicine and biomanufacturing. Dr. Young is also a co-founder of Metalytics, Inc., which is a provider of metabolic flux analysis software and services to the biotechnology industry.

¹³C FLUX ANALYSIS IN METABOLISM RESEARCH: FROM CELLS TO *IN VIVO* MODELS

metabolic disease mechanisms both in cellular and *in vivo* models. Over the past decade, my lab has focused on establishing novel ¹³C MFA tools and approaches that enable us to probe entirely new aspects of metabolism previously inaccessible to measurement. In particular, we have developed a publicly available software package called INCA that automates the computational workflow of MFA. I will discuss several ongoing studies where my lab has leveraged INCA to (i) identify targets for metabolic engineering of host cell factories and (ii) investigate metabolic disease mechanisms using ²H/¹³C MFA to assess fluxes in cultured cells and animal models. These studies have established ¹³C flux analysis and the INCA software package as a comprehensive platform to map intermediary metabolism in a wide range of biological systems.

¹³C metabolic flux analysis (MFA) is the gold standard approach for quantifying rates of biochemical reactions in living cells. It has been widely applied to debottleneck the metabolism of industrial host organisms, but it is now being increasingly used to investigate