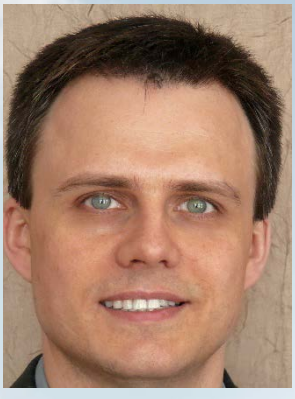
MIT Chemical Engineering Department

Fall 2017 Seminar Series

http://web.mit.edu/cheme/news/seminar.html

Measuring Metabolism in Microbial Communities



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Friday, November 3, 2017

3:00pm, refreshments at 2:45pm

66-110

Abstract:

Measuring intracellular fluxes by ^{13}C metabolic flux analysis (^{13}C-MFA) has become a key activity in metabolic engineering, biotechnology and medicine. Here, I will present new advances in ^{13}C-MFA that have extended the scope of this technology to more complex biological systems. Specifically, I will demonstrate a new approach that we have developed for elucidating syntrophy in microbial communities. Syntrophy (or cross-feeding) is the co-existence of two or more microbes whereby one feeds off the products of the other. To dissect such interactions in complex communities we have developed a multi-scale ^{13}C-MFA modeling approach that allows us, for the first time, to quantify metabolism, metabolite cross-feeding, and population dynamics.

Overall, the methods we have developed have opened new areas of investigation, allowing us to dissect systems that are of significant importance to biology. More broadly, by better understanding coordinated relationships at the genetic, molecular, cellular, and systems levels we are generating new knowledge on microbial syntrophy that enables us to ensemble synergistic interactions in engineered microbial communities for applications in biotechnology and medicine.

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