

# Model-guided evolution of microbial species and communities

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**Directed evolution of metabolic networks in microbial species and communities is much desired in several biotechnological and environmental applications. This, however, is difficult in the case of complex traits that are not directly growth/fitness associated. Towards addressing this challenge, I will present two approaches that my lab is presently working on: engineered exaptation and synthetic mutualism. Both approaches make use of genome-scale metabolic models to identify optimal nutritional environment for adaptive laboratory evolution experiment so as to exert a strong selection pressure on the desired metabolic traits. I will discuss the underlying theory, algorithmic implementation, and our first experimental results based on case studies involving wine yeasts and lactic acid bacteria.**

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