

## Designing enzyme catalysed reaction networks

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Various measures e.g. atom economy or number of used reactions are frequently used in Organic Synthesis to evaluate and compare different total synthesis'. These measures shape the strategies how organic chemists design a synthesis to a target molecule. Metabolic engineering, a sub-field of Synthetic Biology, investigates the de-novo construction and design of enzyme catalysed reaction networks for in vitro and/or in vivo production of commodity chemicals. Since for many target molecules no natural pathways are known, recombination of enzyme functionality under optimality criteria becomes important to guide the design efforts. But what does "optimal" mean in a biological context? I will present a computational framework which allows to explore and rank the entire network design space spanned by a set of enzymes, starting compounds, and some measure of optimality.