

## CYANOBACTERIA AS PHOTOSYNTHETIC FACTORIES: SYNTHETIC BIOLOGY METHODS IN THE DEVELOPMENT OF NEXT-GENERATION PRODUCTION PLATFORMS

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The aim of the project is to use synthetic biology to generate improved cyanobacterial cell factories for the production of desired metabolites directly from CO<sub>2</sub> and water using sun as the sole energy source with the emphasis specifically on the *production efficiency* of the systems. Importantly, the project generates a framework which can be used to assemble and optimize many different kinds of pathways in the cyanobacterial host *Synechocystis sp PCC 6803*. Significant effort has been placed on the development of assembly systems and characterization of carefully selected genetic components in *Synechocystis*. This system allows (i) flexible assembly of complex expression constructs in a relatively high throughput manner, (ii) quantitative evaluation of the systems *in vivo* using selected fluorescent markers, (iii) generation of optimized synthetic pathways with validated genetic regulatory systems. This study combines the power of the synthetic biology tools developed in the current work, and bioinformatics analysis of potential pathways to generate potentially interesting end-products