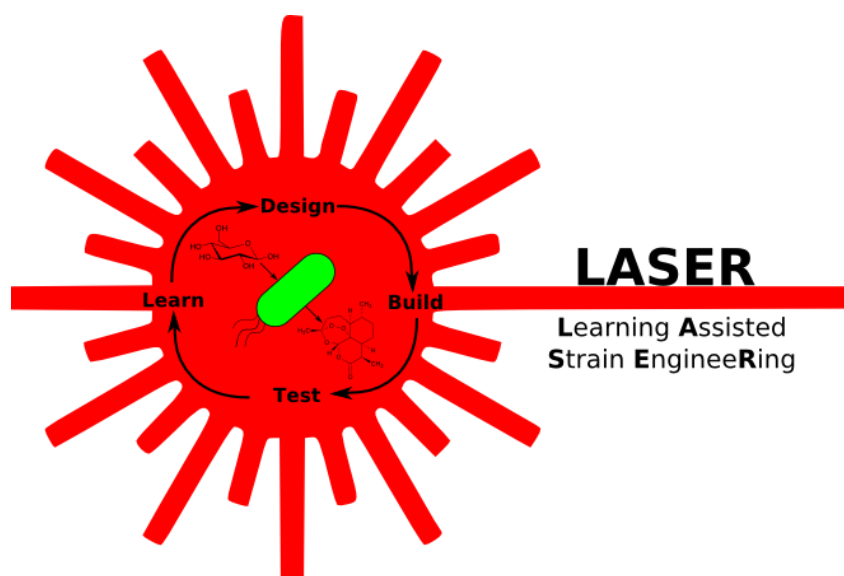


The LASER Database: Building a Learning Platform for Metabolic Engineers

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Project Goals: Metabolic engineers have successfully engineered microorganisms to produce compounds ranging from biofuels to pharmaceuticals. However, this engineering process is largely *ad hoc*, with the majority of biocatalysts still being developed through researcher intuition instead of formalized modeling. We first developed the 2014 LASER (Learning Assisted Strain EngineerRing) database to address this issue by providing a standardized platform and software tools for analyzing engineered strains that could be used for quantitative field analysis. After a year of additional data curation and software development, we now introduce the expanded LASER 2015 (<http://laser.colorado.edu/>) database, containing over 600 curated designs from more than 400 papers. Key areas of expansion include the establishment of the first complexity metrics for assessing the engineering effort required for developing a given biocatalyst, development of machine learning-based approaches for developing convenient chassis strains, and a comprehensive “state of the field” overview of metabolic engineering. We also introduce a unique approach towards estimating the complexity of metabolic engineering designs, in order to reduce the experimental effort required for implementing potential design libraries. We anticipate that LASER will remain a powerful basis for understanding and improving metabolic engineering practices for years to come.

Project Website: laser.colorado.edu