

## Development of pipelines for high-throughput rational strain construction and testing: The industrialization of synthetic biology

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Optimization of microbial production of any target molecule requires repeated iterations of the design-build-test-Learn (D-B-T-L) engineering cycle in order to re-write the genetic code of the production host. The rate at which any team can execute the D-B-T-L engineering cycle directly affects the time to market for any new product. At Amyris, we have built the Automated Strain Engineering (ASE) and High-Throughput Screening (HTS) pipelines that rapidly accelerate the D-B-T-L cycle at a high-throughput scale. Our goal is to reduce cost and cycle time, increase efficiency, and allow access to hitherto intractable hosts. With these capabilities, scientists at Amyris can probe multiple hypotheses simultaneously, speeding the cycle of strain improvement and parallel investigation of multiple solution sets. Development of these platforms was however a massive undertaking, which required collaborations across multiple disciplines and breaking down the most miniscule strain engineering steps into protocols that could be controlled by software programs and automation scripts. This presentation will cover details of the automated platforms that enabled Amyris scientists to rapidly iterate through multiple D-B-T-L cycles of the strain engineering process.