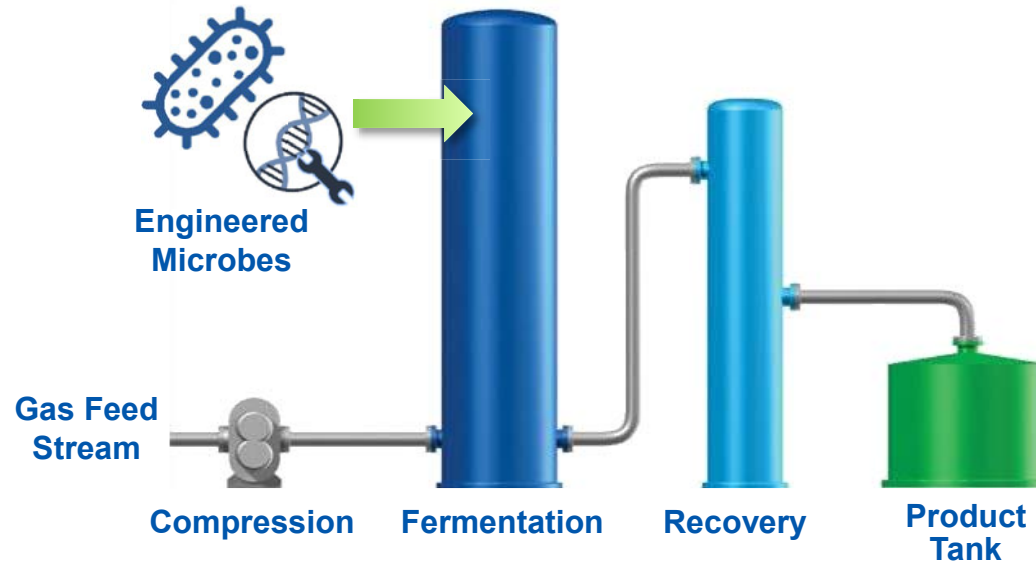
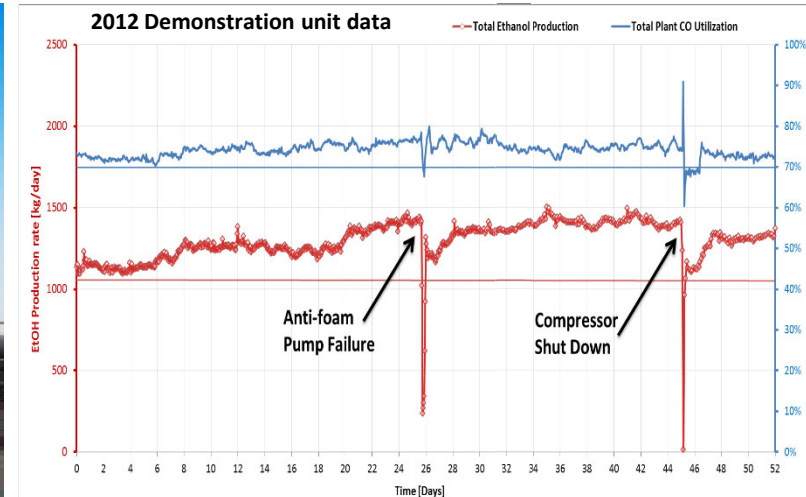


The LanzaTech Process

Gas fermentation technology converts C-rich gases to fuels and chemicals

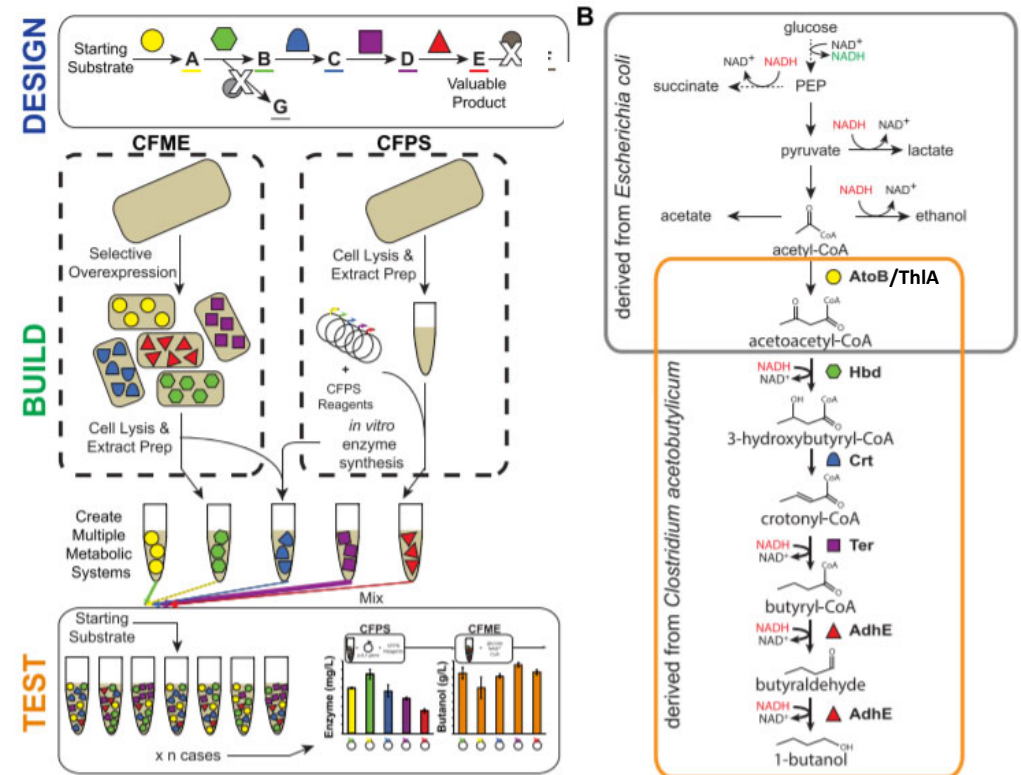


Continuous process, gases as only source of carbon



Guidance Of Strain Engineering Through Cell-Free Synthetic Biology

- The Jewett lab @ Northwestern University has established a cell-free framework for rapid pathway prototyping (Karim & Jewett, 2016, *Metab. Eng.* doi.org/10.1016/j.ymben.2016.03.002)
- Collaboration to compare pathway performance between the cell-free environment and *in vivo* in an industrial host using n-butanol pathway as initial testbed
- Preliminary data suggest correlation between *in vitro* and *in vivo* data, with same variants that perform best

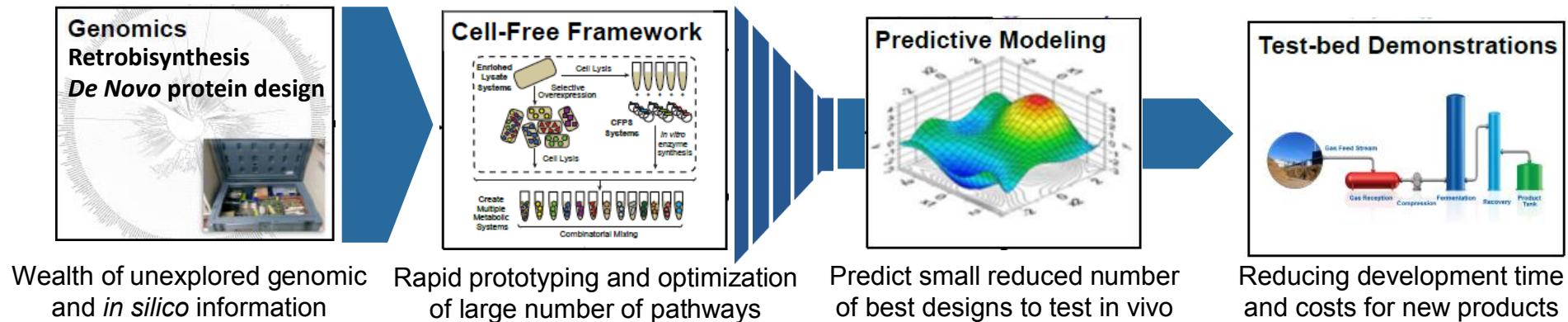


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Opportunities & Challenges

- Cell-free protein synthesis has potential to reduce costs and accelerate Design-Build-Test (DBT) cycles by more than an order of magnitude, bypassing the transformation idiosyncrasies and low throughput workflows that impede progress on many non-model microorganisms



- To date, there are no sufficiently large and multi-dimensional datasets available that allow comparison of pathway performance between the cell-free environment and *in vivo*
- Need a predictive model framework for the *in vivo* performance of transcription, translation, enzyme activities, and metabolic network performance by correlating various aspects of cell-free metabolism
- Most cell free approaches today rely on *E. coli* and use of sugars. For both, pathway prospecting as well as biocatalysis applications, there is a need to expand the range of cell-free platforms to other systems and substrates

