

Choose hio First

Electrofermentation with Recombinant *S. Cerevisiae* for Increasing Fermentation Yields **AKA** **California Dreaming: Industrial Biotechnology** **in the Heart of Silicon Valley**



Mario Alberto, Chemical Engineering Senior, CSU

Advances in metabolic engineering and strain engineering have allowed for many specialty and bulk chemicals to be produced from a feedstock of biomass. This is accomplished by adding biosynthetic pathways to the engineered organism that exist alongside the native metabolic pathways. There are many barriers that restrict the yield of these processes; one of which is the deficit of reducing power in the form of NADH. This shortage has two causes: 1.) the production step where NAD⁺ is reduced to NADH must be bypassed to produce the target fermentation product and 2.) both the native and engineered pathways utilize this coenzyme in its reduced form. To bypass this bottleneck, electrofermentation seeks to add reducing power by directly providing electrons to the process in a form that can be uptaken by the organism. This project was completed over the course of a summer in Palo Alto, California at the Genencor technology center of IFF. A novel electrofermentation unit was designed, constructed, and tested with various recombinant strains of *S. Cerevisiae*. Using this novel fermentation setup was shown to increase both the yield and production rate of the desired fermentation target. A high-level overview of results is provided as well as reflections on interning in the birthplace of Silicon Valley.

SR - 151

11:30 - 12:20

Tuesday, April 25th, 2023