High-throughput quantitative proteomic profiling of *Escherichia coli* central carbon metabolism

Yan Chen,[1,2] Jonathan Vu,[1,2] Marcin P. Joachimiak,[2,3,4] David Ando,[1,2] Leanne Jade G. Chan,[1,2] Paul D. Adams,[1,2,5] Héctor García Martín,[1,2,4] **Christopher J. Petzold[1,2,4*]** (cjpetzold@lbl.gov)

[1]DOE Joint BioEnergy Institute, Emeryville, CA; [2]Lawrence Berkeley National Laboratory, Berkeley, CA; [3]DOE Systems Biology Knowledgebase, Emeryville, CA; [4]DOE Agile BioFoundry, Emeryville, CA [5]University of California, Berkeley, CA.

https://www.jbei.org

Project Goals:

Achieving a bioeconomy that produces "drop-in" and novel fuels drives many aspects of metabolic engineering and synthetic biology research. Yet, despite large investments in time and money many challenges remain to realizing economic conversion of sugar to biofuels. Thus, it is crucial to modify the host metabolism to produce large amounts of target molecules. These efforts benefit from large -omics datasets that inform predictions, however, many samples must be analyzed to understand the host metabolism and develop actionable information. This requires significant resources both to efficiently develop methods for new hosts and analyze them in a high-throughput manner. In this work, we describe a workflow using data acquired from discovery proteomic experiments and demonstrate its utility by quantifying 73 proteins from *E. coli* central metabolism in over 500 KEIO collection knockout strains grown in two media conditions with biological replicates. This work enables systems biology research which drives scientific discoveries, adds statistical power to biological hypotheses, and provides an extensive resource for metabolic engineering in *E. coli*.

This work was part of the DOE Joint BioEnergy Institute (http:// www.jbei.org) supported by the U. S. Department of Energy, Office of Science, Office of Biological and Environmental Research through contract DE-AC02-05CH11231 between Lawrence Berkeley National Laboratory and the U. S. Department of Energy and was part of the Agile BioFoundry (http://agilebiofoundry.org) supported by the U.S. Department of Energy, Energy Efficiency and Renewable Energy, Bioenergy Technologies Office.