



Agile Biofoundry CRADA Project - LanzaTech

Title:

Data Integration and Deep Learning for Continuous Gas Fermentation Optimization

Project Partners:

Argonne National Laboratory, National Renewable Energy Laboratories & LanzaTech

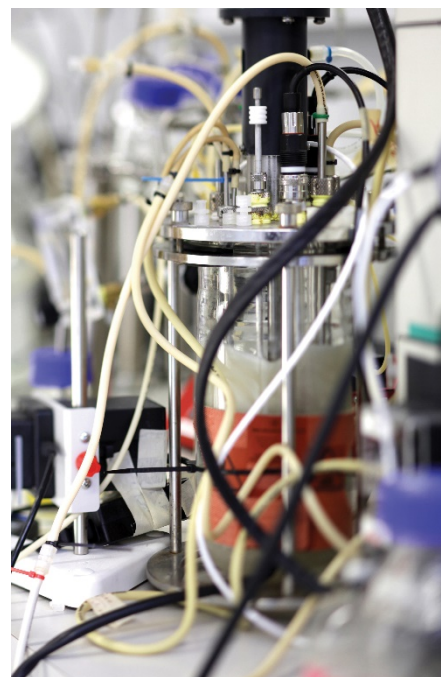
Relevant ABF Capability(ies):

Learn: [Machine Learning](#)

Learn: [Deep Learning](#)

Description:

Argonne National Laboratory, the National Renewable Energy Laboratory (NREL), and LanzaTech have joined under the aegis of the Agile BioFoundry to develop machine and deep learning models to optimize continuous fermentation of industrial and synthetic gas. LanzaTech's first commercial scale (16M gpa) industrial off gas to ethanol plant has been operational since May 2018. LanzaTech's unique collection of specialized fermentation data will be coupled with Argonne's sophisticated computational expertise to optimize the fermentation process at scale. The project will integrate output from LanzaTech's third generation genome scale model of the acetogen *Clostridium autoethanogenum*, with omics, and fermentation data into a data warehouse and use the refactored data to train machine learning. This will be followed by using deep learning expertise from Argonne to develop an 'in-line' artificial intelligence-guided process that will monitor and adjust industrial fermentation conditions in real time, optimizing the fermentation output. Model output will be integrated with Agile Biofoundry (ABF) electronic data depot resources. The artificial intelligence-system will be validated in silico in this project on both LanzaTech and NREL fermentation data and will potentially be implemented in laboratory-scale fermentation systems in future collaborations.



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Performance period: 05/01/18 – 04/30/20

Resulting publication(s)/patent(s): None to date