Optimization of a 20,000L Bioreactor Through CFD Simulation Analysis

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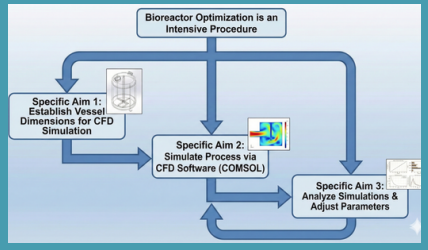
Engineering Problem:
Physical optimization of bioreactors can be extremely time and resource intensive

Engineering Objectives:
1. Establish an accurate model for simulation
2. Simulate and analyze factors of performance
3. Adjust parameters for improved operation



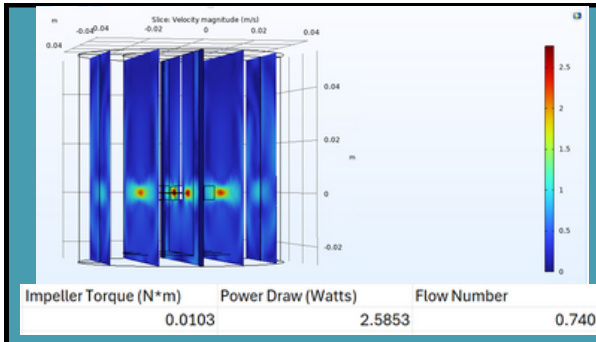


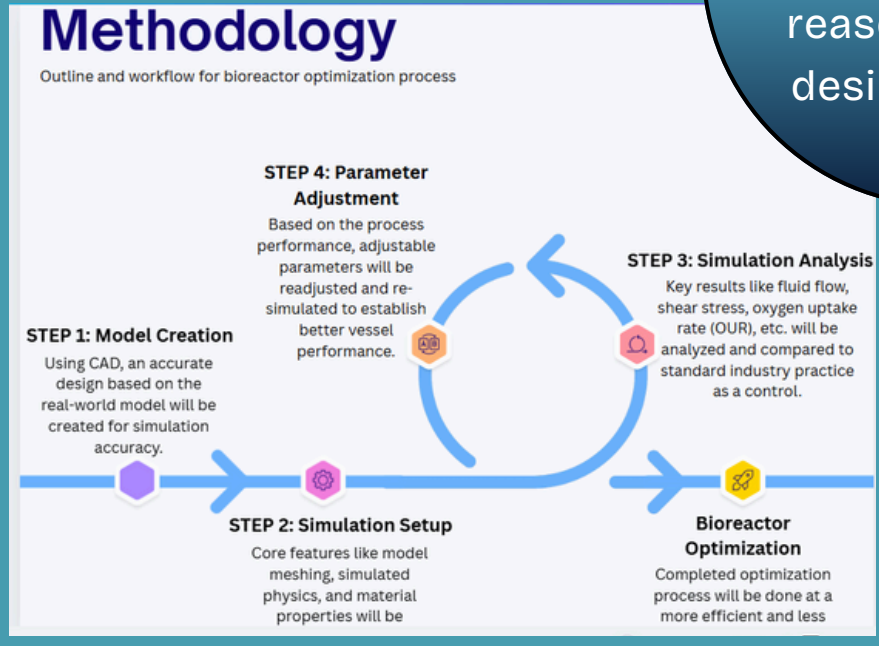
Figure 1: Simulation results of fluid velocity in smaller-scale model

Impeller Torque (N*m)	Power Draw (Watts)	Flow Number
0.0103	2.5853	0.7406

Figure 2: Simulated impeller torque, power draw, and flow number

Preliminary simulations show accuracy by reasonable and desired results

Fluid velocity and calculated values are expected at this scale. Importantly, the low flow number shows the conditions won't be too harsh for cells.



-Preliminary simulations show accuracy, reasonableness, and desired process operation considering the model and its scale.

-Accuracy in preliminary simulation setup ensures future simulation setup accuracy for the 20kL bioreactor simulation

-Especially relevant given the high simulation time and processing power required for larger-scale simulation.