Session 3	Artificial Intelligence in service of biomanufacturing
Pitch Title	Machine Learning-Driven Simulation and Optimization of Microbial Behavior Across Scale-Up Stages
Company	Differential Bio
Speaker	Christian Spier
Keywords feedstock	Optimized Feedstock
Keywords technology	Maschine Learning, High-throughput screening:
Keywords End-Product	Digital Fermentation Twin

Abstract:

fungtional.bio is revolutionizing biomanufacturing with a platform that predicts and optimizes microbial behavior for all scale-up stages. Our vision is a platform that enhances fermentation R&D across feedstock selection, medium optimization, bioprocess adjustment, strain refinement, and scale simulation. Utilizing a robust data-acquisition pipeline, we gather foundational data from various bioprocess parameters, enriched by synthetic data from metabolic models, to train our precise machine-learning models. Currently, our models boast an R^2 of 0.92, demonstrating their ability to accurately forecast biomass growth under diverse conditions.

Our microorganism modeling pipeline allows for detailed interpolation and model tuning using proprietary and public datasets, simulating behavior at multiple scales crucial for effective scale-up. Our infrastructure supports this with high-throughput, controlled labs, ensuring our simulations are empirically grounded. This approach provides bio-manufacturers with a cost-effective, adaptable toolset, ensuring technical and economic production success. fungtional.bio not only pushes the technological boundaries of bioproduction but also streamlines the path from innovation to market, enhancing efficiency and throughput in biomanufacturing processes.