Session	Emerging innovative technologies: novel fermentation and novel downstream processing innovations
Title	The Intelligence Engine for the Bioeconomy: From Fermentation Data to Predictive Design
Company	Differential Bio GmbH
Speaker	Christian Spier
TRL	TRL 8-9
Keywords feedstock (max 2)	Growth media
Keywords technology (max 2)	Biomass, metabolites
Keywords End-Product (max 2)	Robotics, AI

Abstract:

Fermentation development remains slow and experiment-intensive, with media composition and process conditions strongly influencing yield and production cost. Differential Bio combines miniaturised, robotic fermentation experiments with machine learning to replace trial-and-error with predictive, model-guided optimisation. Automated experiments generate standardised data on microbial growth, enabling strain-specific models to explore media and process conditions virtually. Promising formulations are then tested experimentally in a continuous learning loop. In a collaboration with probiotic manufacturer CanBiocin, the platform screened over 3,000 media formulations in four weeks. The selected formulation increased biomass yield by 34.1% while reducing media cost by 27.6%, with results validated in bioreactors under production-relevant conditions. The pitch will show how integrated automation and predictive modelling can accelerate media development and improve fermentation economics, helping biomanufacturers move towards more efficient and scalable production. We welcome collaborations with fermentation-based producers seeking to optimise microbial biomass, ingredients and other biobased products.