DATAHOW

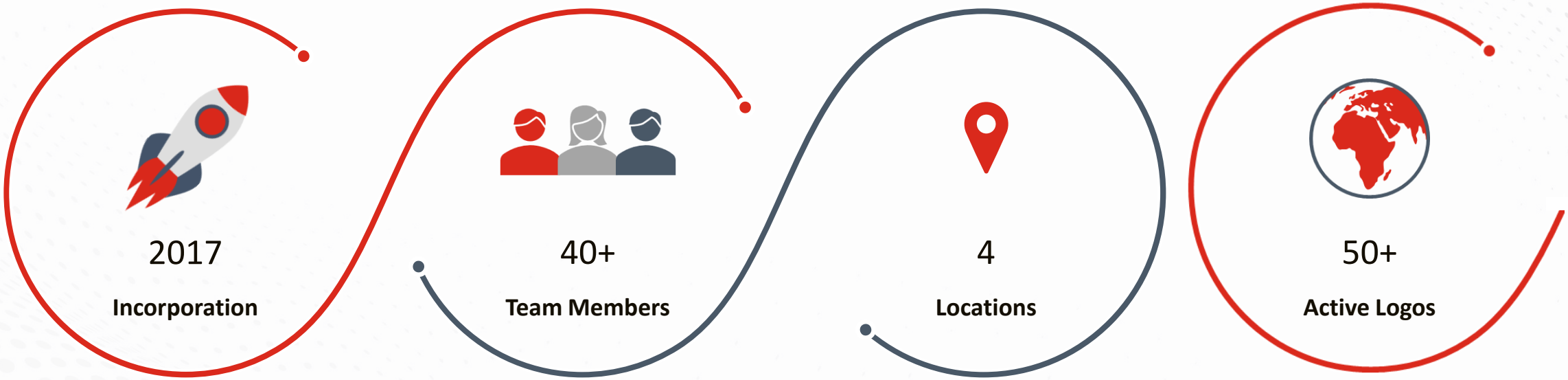
Developing and Deploying Digital & AI Solutions in Biopharma

November 2026

Dr. Niels Krausch | Senior Process Modeling Engineer

DataHow

Some Numbers



2017

Incorporation

- 4 Co-Founders
- 35yrs R&D experience
- 20yrs Industry experience
- >30yrs Machine Learning

40+

Team Members

- 10 Countries
- 40% Engineering
- 50% Software
- 10% S&M and Admin

4

Locations

- HQ in Zürich (CH)
- Subsidiary in Lisbon (PT)
- Subsidiary in Milano (IT)
- Subsidiary in Philadelphia (US)

50+

Active Logos

- 18 of 20 largest pharma
- 60% Europe, 35% USA
- 4 active integrations with OEMs

© DataHow

AI-Technologies democratizing Access to deep process knowledge and the creation of Digital Twins

Transfer Learning

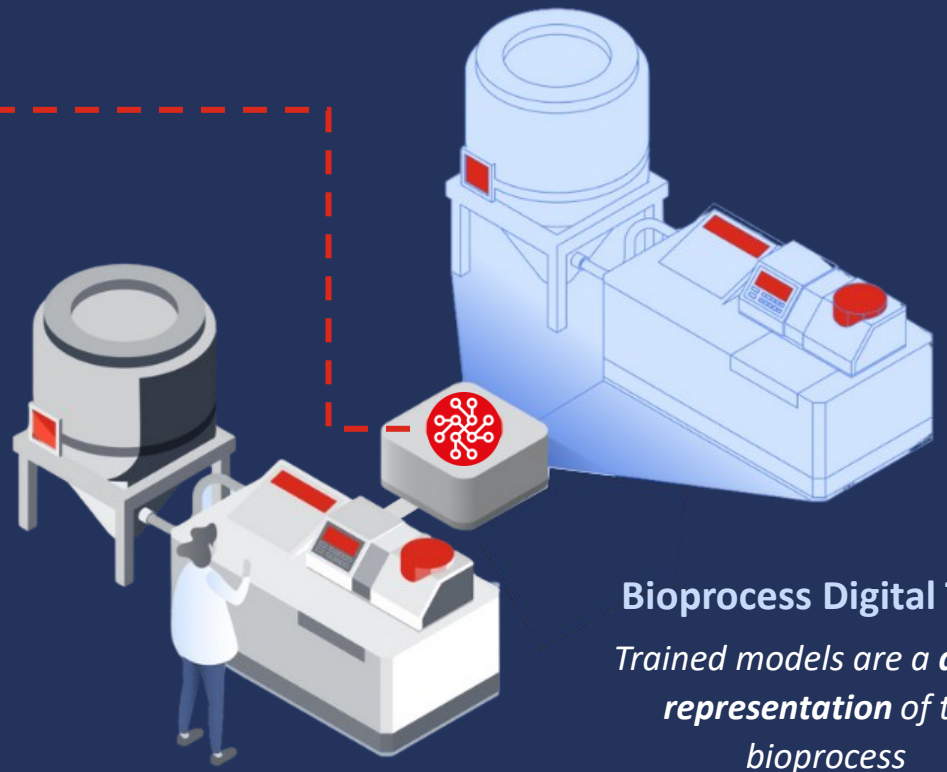
AI-enabled transfer of historical process knowledge across projects and scales to ***reduce experimental effort and accelerate development***

Hybrid Models (AI)

AI-enhanced models adapted to bioprocessing for ***accelerated learning & insight with less data***

Multi-objective Bayesian Optimizations

Outcomes & analysis assessments based on ***probabilities***



Bioprocess Digital Twin

Trained models are a ***digital representation*** *of the bioprocess*

DATAHOW

DATAHOW

Hybrid Models

Accelerate learning by incorporating prior knowledge



Selected Case: Impact of Hybrid Models

Hybrid Models: Stronger CQA understanding with less data and experiments

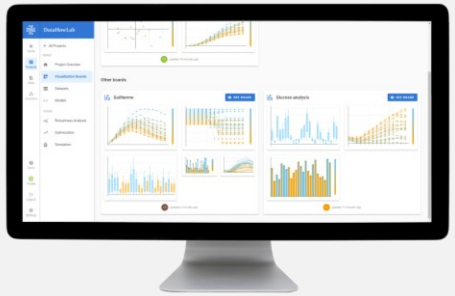
Bristol Myers Squibb

The Project:

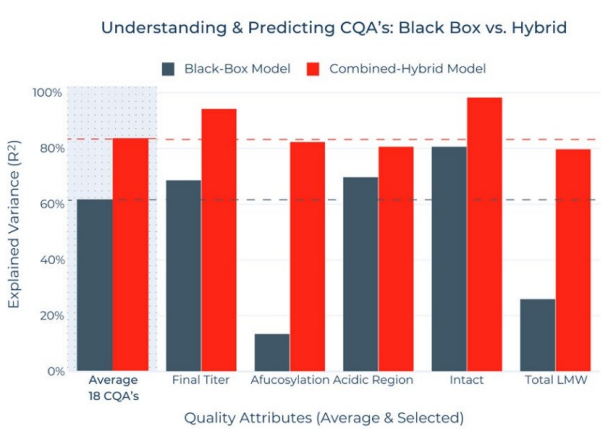
Evaluate the ability of **DataHowLab's Hybrid Models** to accurately predict CQAs compared to industry state-of the-art "black box" models.

The Challenge:

48 (5-liter scale) experiments were designed and conducted by BMS to evaluate the impact of **12 process parameters** on **18 product CQAs.**

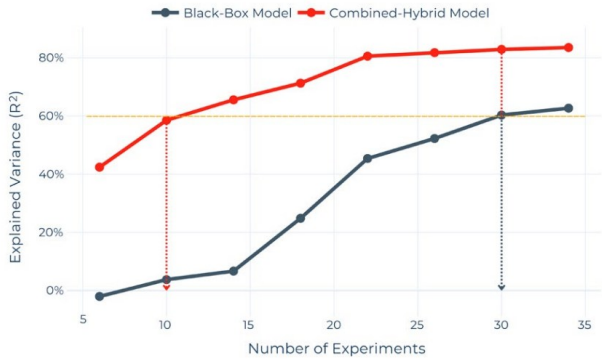


Understanding & Predicting CQAs: Black Box vs Hybrid



35% CQA Prediction

# of Experiments required to predict CQAs: Black Box vs Hybrid



3x Fewer experiments

Stronger CQA Prediction & Control

- On average, **Hybrid models** were able to predict CQAs **+35%** better than standard "black box" models
- **Hybrid models** were able to predict CQA's where "black box" models had no clear understanding even after 48 experiments

More insight, with fewer experiments

- Black box models needed **30 experiments** before they could accurately predict CQA values
- Hybrid models only required **10 experiments** to reach the same level of predictive accuracy

© DataHow

Mammalian USP

Optimization

Hybrid Models

Selected Case: Impact of Hybrid Models

Hybrid Models: Stronger CQA understanding with less data and experiments

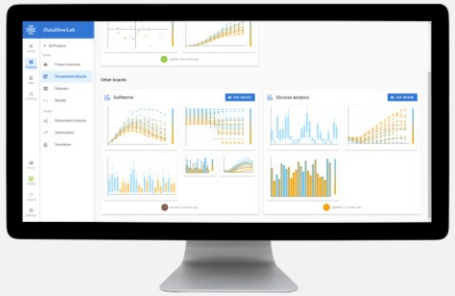
Bristol Myers Squibb

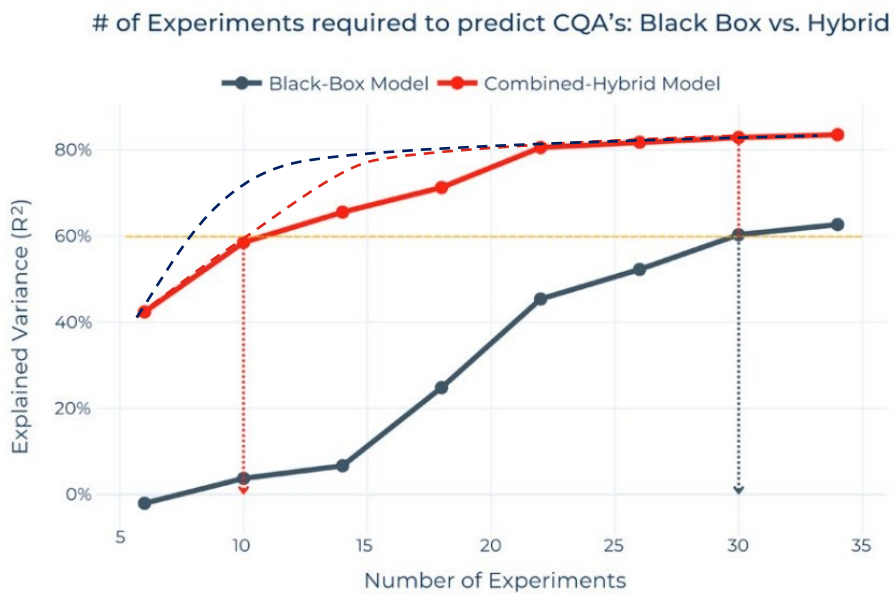
The Project:

Evaluate the ability of **DataHowLab's Hybrid Models** to accurately predict CQAs compared to industry state-of the-art "black box" models.

The Challenge:

48 (5-liter scale) experiments were designed and conducted by BMS to evaluate the impact of **12 process parameters** on **18 product CQAs.**





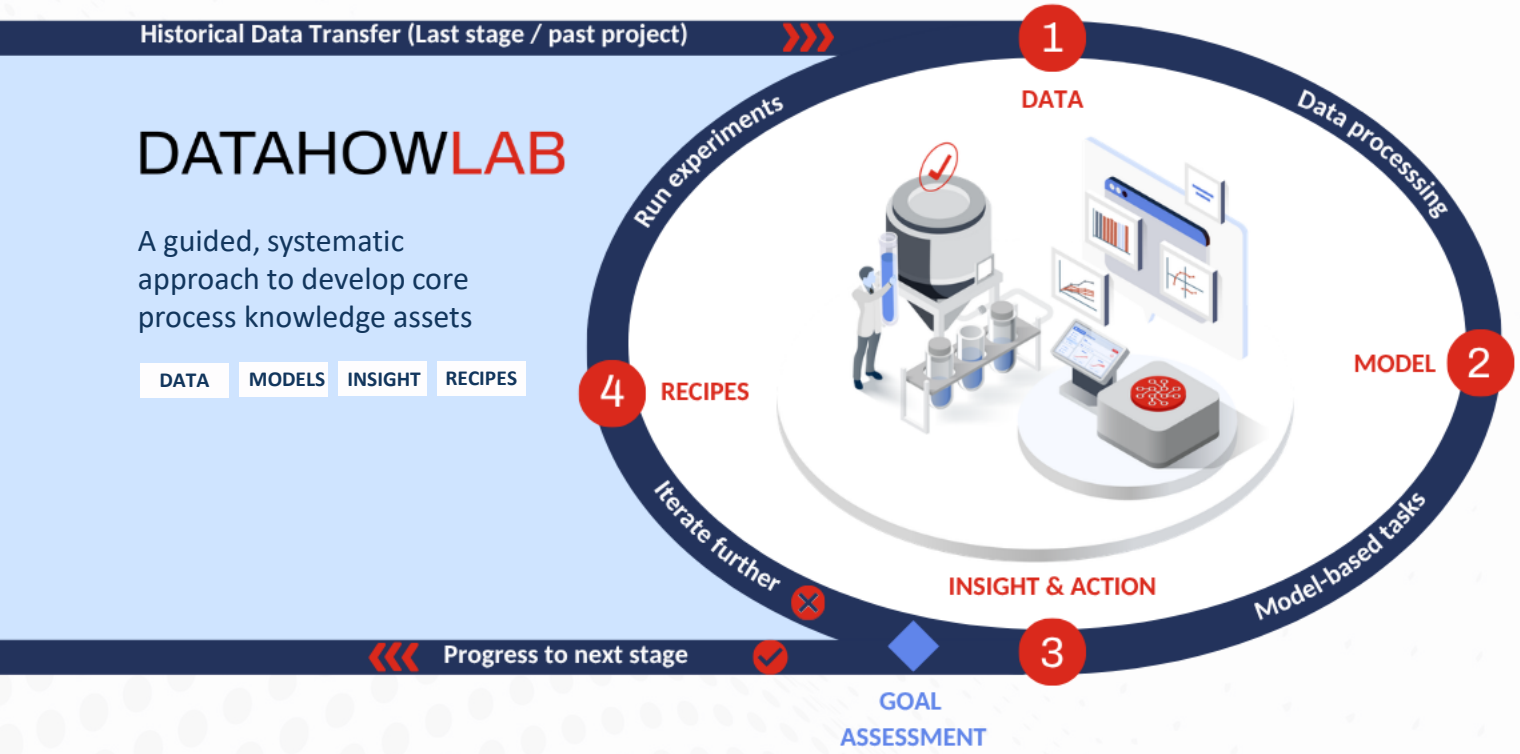
1. Strong experimental reduction
2. Minimal compromise on experiments vs number of parameters
3. Quick generation of knowledge = better decisions
4. Limited marginal improvement from model quality

J. Polak et al., 2024, An innovative hybrid modeling approach for simultaneous prediction of cell culture process dynamics and product quality, Biotechnol. J., 19, 2300473

DataHow Methodology

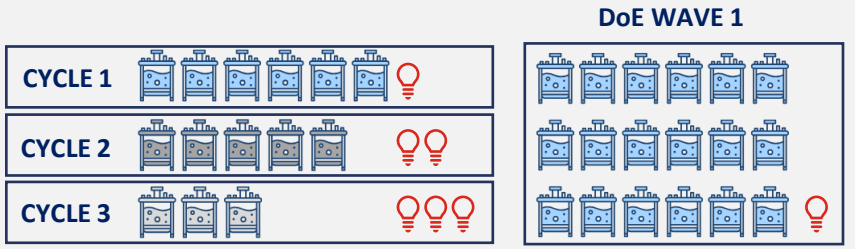
Shorten time to knowledge – Operate always at optimal conditions





METHODOLOGY EMBEDDED IN DATAHOWLAB

1. Connection / Historical data
2. Automated model creation
3. Insights & Prescriptive actions
4. Optimal Design of Experiments



DATAHOW

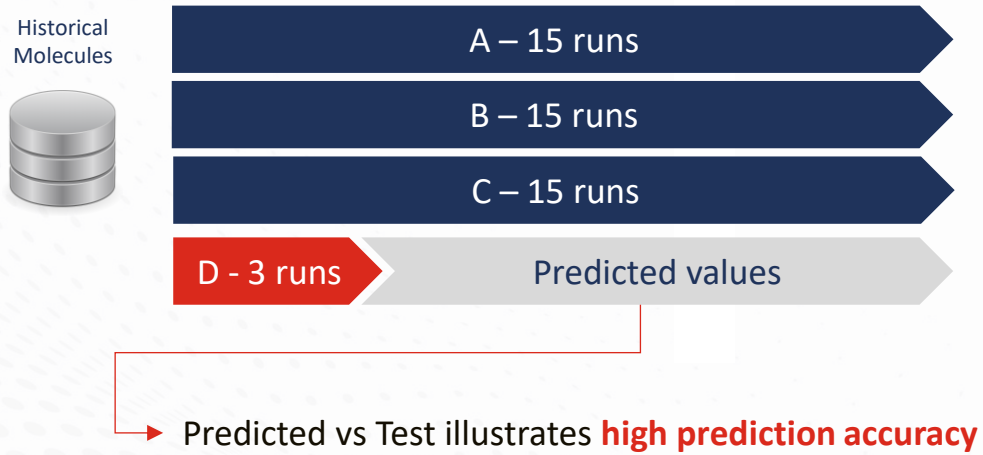
Transfer Learning

Your data as a development asset
& driver of operational efficiency

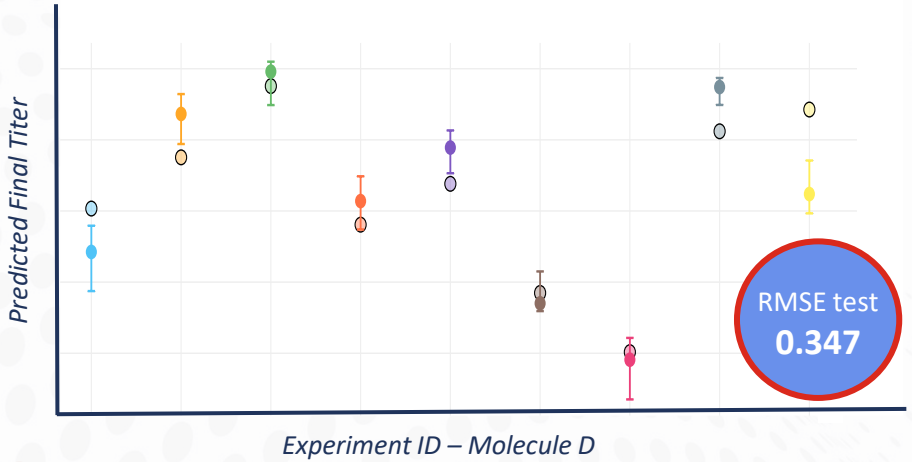


Selected Case: Accelerate Clone Selection via Transfer Learning

Predicting molecule specific behaviour (Molecule - D) with only 3 runs



Predicted vs Test illustrates **high prediction accuracy**



Model trained on 15 runs of molecules A, B & C + 3 runs of D

- The behaviour of molecule D can be learned effectively from only 3 runs of D and transferred knowledge from molecules A-C.
- Transfer learning can significantly accelerate clone selection process
- The trained model could suggest optimal clone choice & process design

→ **IMPACT: Reduction of Runs / Accelerated Development**

© DataHow

DATAHOW

Connect, Learn, Control

Optimally navigate through the process and knowledge uncertainty



Mammalian

R&D

Digital Twin

Real-time control of 24 parallel ambr250 bioreactors in perfusion mode with a digital twin

Self-driving system: robotics + digital twin technologies

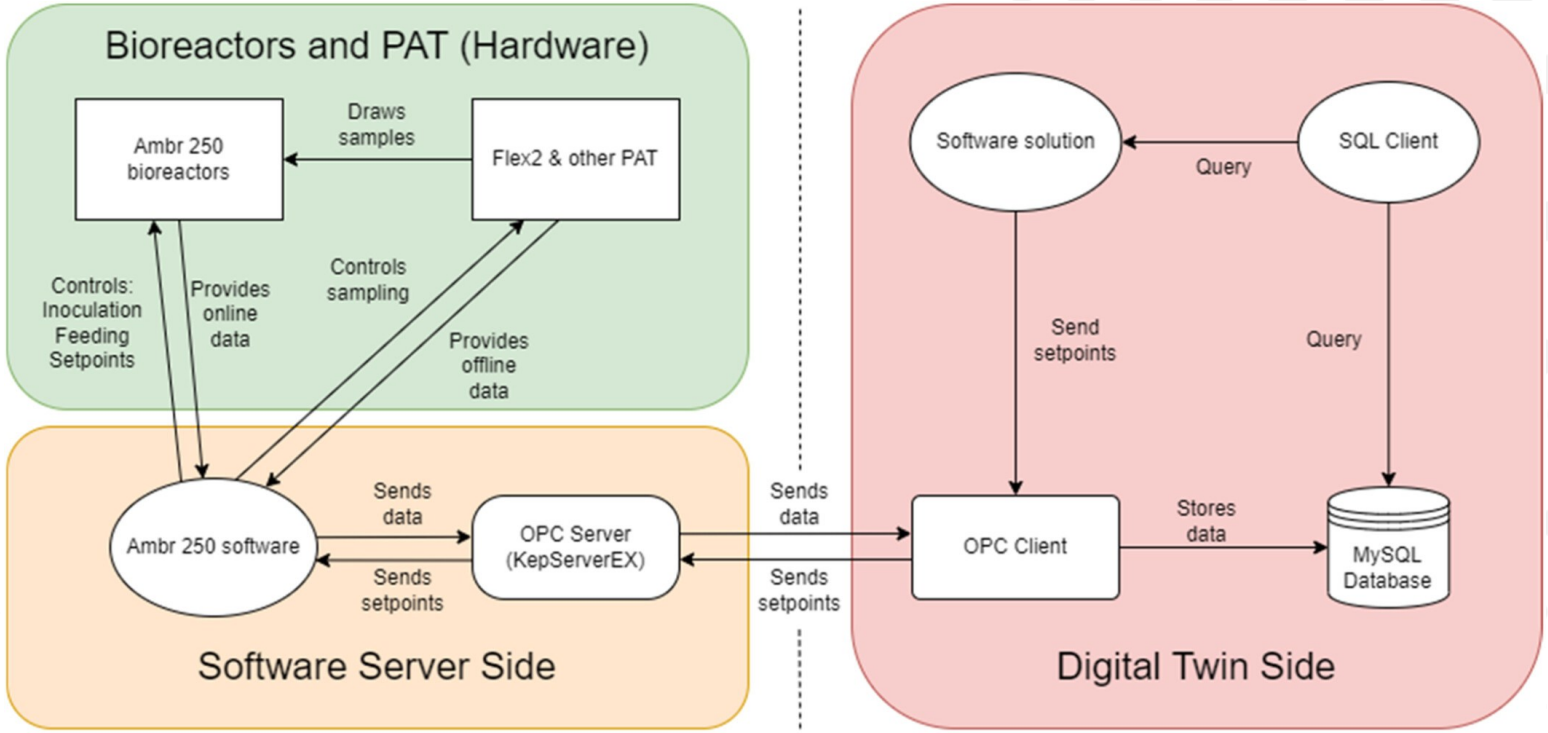


Proof of Concept developed using 24-parallel mini-bioreactor perfusion platform (Ambr®250 robotic platform) in combination with a digital twin software agent, capable of:

- Embedding existing process knowledge
- Utilizing information from similar processes
- Learning during experimentation
- Predicting future events
- Autonomously operating the parallel bioreactors to achieve challenging objectives

27-day long cultivation, of which **20 days operated by the autonomous software agent**

Interconnectivity of the System







© DataHow

Target 1: Model prediction capability

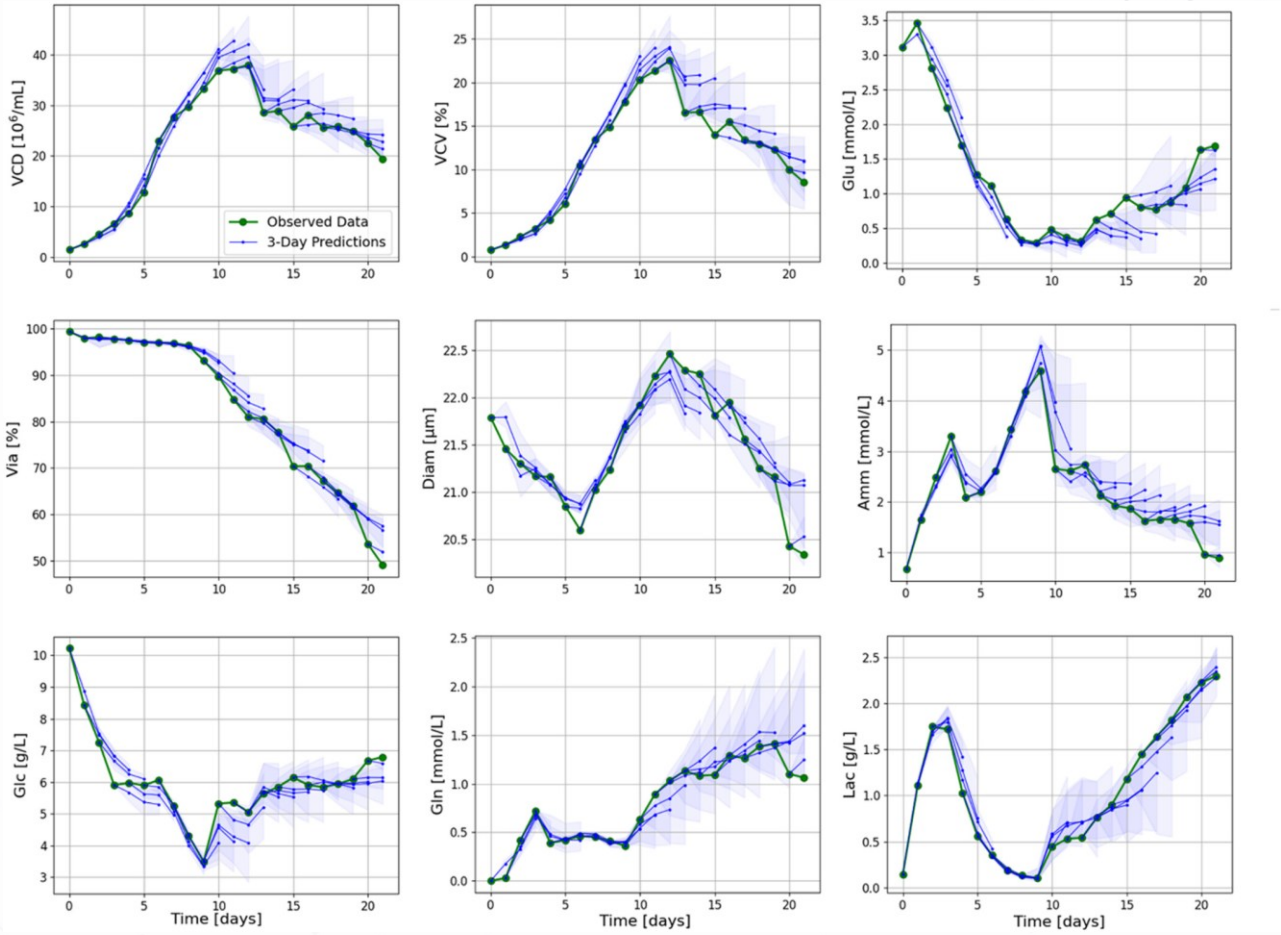
Assessing the predictive digital twin of our system

Median model prediction (of all 24 runs) and the prediction interval for the **following 3 days on each day of operation**

Observations:

- The model predicts the trends of the process accurately
- The **observed process data** is within the prediction interval of previous predictions

The results demonstrate that the model can learn the process behavior and can make meaningful and reliable predictions.



C. Gadiyar et al., 2026, Self-driving development of perfusion processes for monoclonal antibody production, Biotechnol. Bioeng., 123, 391

© DataHow

Mammalian

R&D

Digital Twin

Target 2: Dynamic Optimization Controlled by DTW Agent

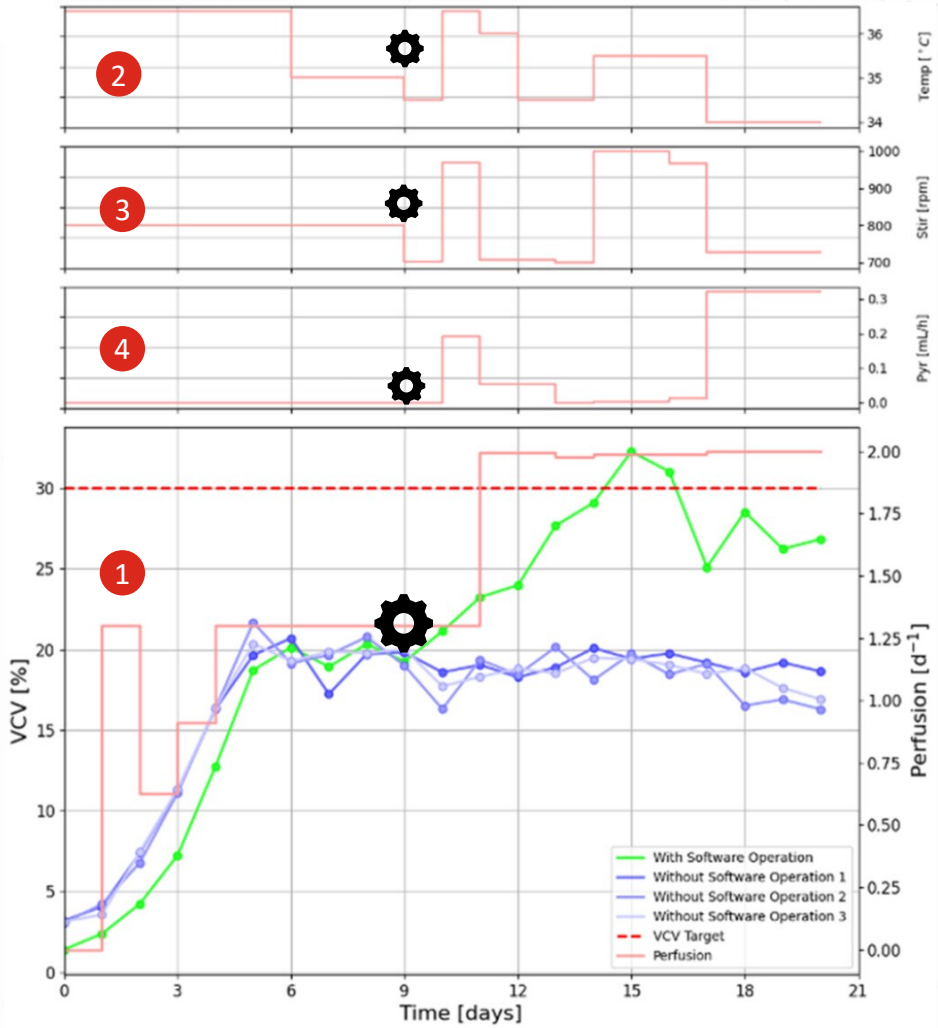
Bioreactor 1: increase VCV to a target value of 30%

- Bioreactor 1: **with software DTW agent**
  agent in operation from day 9
  All the control variables could be varied at a frequency of once per day
- Biorector 2-4: **no software DTW agent**

The software was able to suggest conditions that significantly increased **VCV reaching the target** in contrast to the **benchmark bioreactors**.

The agent autonomously suggested coordinated combination of changes to the control variables from day 9, with the biggest impact on target being:

1. Perfusion rate (large box highlighted)
2. Temperature shift
3. Agitation rate
4. Pyruvate addition flowrate



DataHowLab

AI-Enabled Cloud Bioprocessing Platform

A BIOPROCESS SOLUTION FOR BIOPROCESSING

No-code tools, applications, and workflows are adapted for each process format, operation, and lifecycle, to serve the needs of bioprocess scientists.

DATA AS A DEVELOPMENT ASSET

Transfer insights across molecules and scales to leverage historical data, minimize experimental effort, and accelerate development timelines.

DIGITAL DEVELOPMENT FRAMEWORK

Users are guided through development gates to maximally exploit the use of embedded AI technologies towards process goals.

DIGITAL TWINS & PROCESS SIMULATION

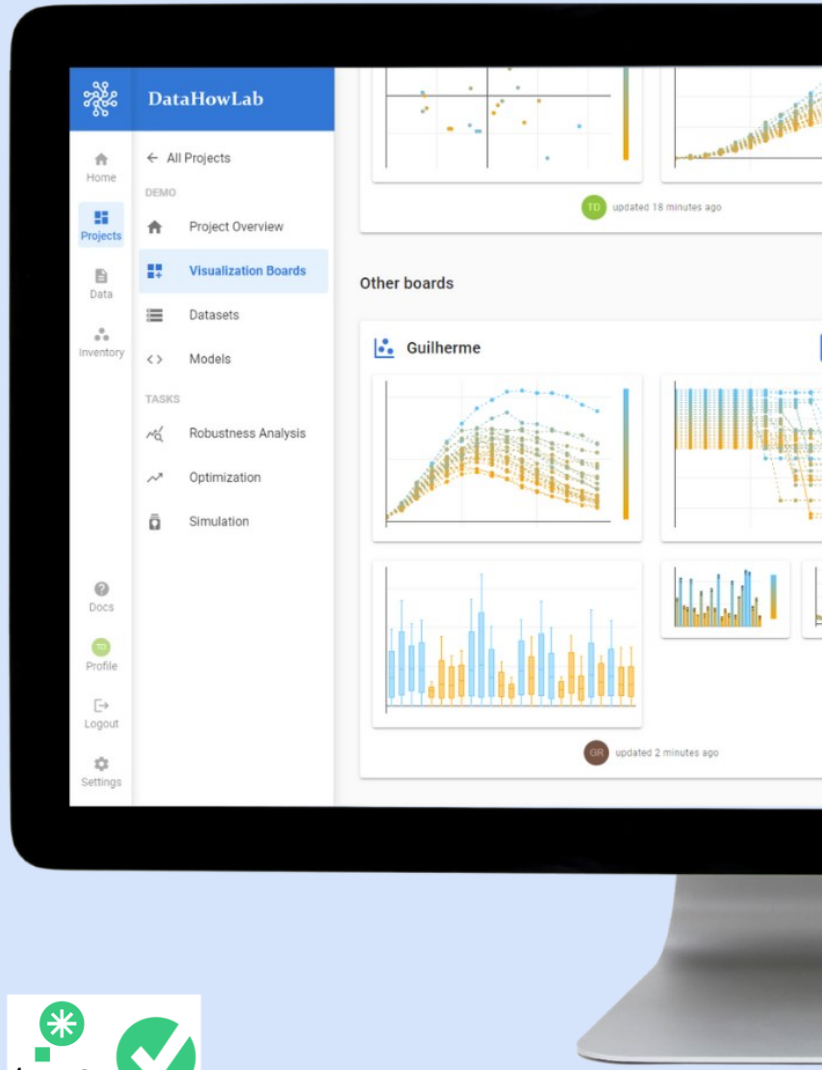
DataHowLab transforms into a digital twin when its powerful hybrid models are combined with process data. True digital bioprocessing.

SINGLE SOURCE OF PROCESS KNOWLEDGE

DataHowLab champions the democratization of process knowledge across the organisation and process lifecycle by storing and deploying insights from shared datasets, projects, and models.

A DIGITAL AUDIT TRAIL FOR YOUR PROCESS

DataHowLab logs every activity taken within the software, providing a detailed audit trail for tech transfer and filing and end-to-end traceability.



POWERED BY AI TECHNOLOGIES ADAPTED TO BIOPROCESSING

DATAHOW

tempo audits
ISO/IEC 27001
INFORMATION SECURITY MANAGEMENT SYSTEM

Trusted and Deployed by many Key Industry Players



Technology Partners



Academic Partners



DATAHOW

Thank you!

Questions?