FROM DATA
TO DISCOVERY

Riffyn

Timothy Gardner, CEO, Riffyn
Biomanufacturing Workshop - February 2021
Event sponsored by Boston University, ITIF & Fraunhofer USA

1957

Glutamate (Ajinomoto)

50 yrs | 0 genes

2006

PDO (Dupont / Tate & Lyle)

15 yrs | 6 genes

2011

Farnesene (Amyris)

6 yrs | 22 genes

Riffy

1957

Glutamate (Ajinomoto)

$1s millions

2006

PDO (Tate & Lyle)

$10s millions

2011

Farnesene (Amyris)

$100s millions

Escalating costs mean fewer world-changing biotech products will reach market

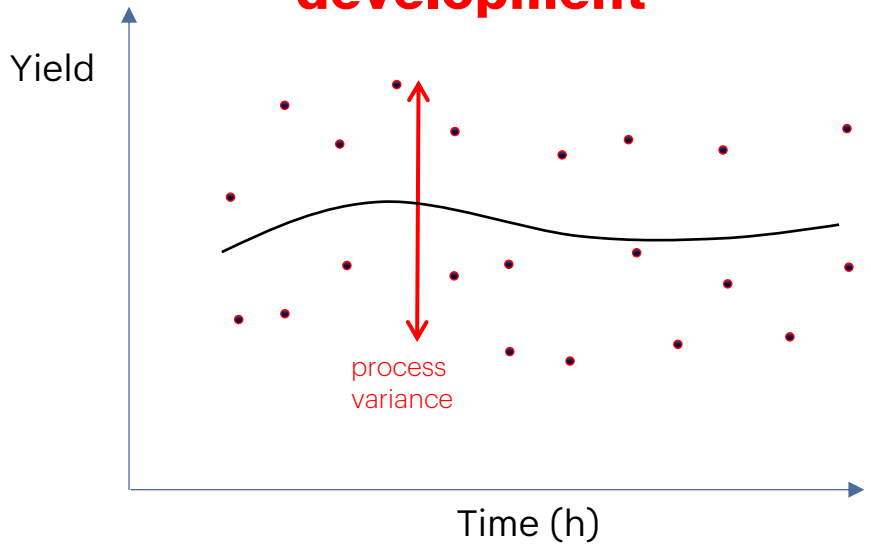
Process quality

Aggregated data

Example: troubles with scale-up due to noisy R&D processes

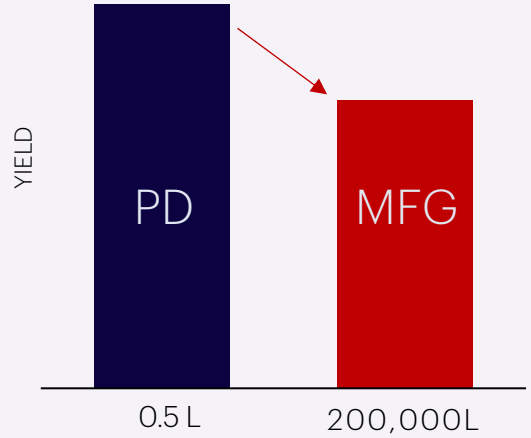
Process variation obscured understanding of true process behavior & capability

Typical PD Batch early in development



HIGH NOISE / UNCONTROLLED PROCESS

Scale-up outcome

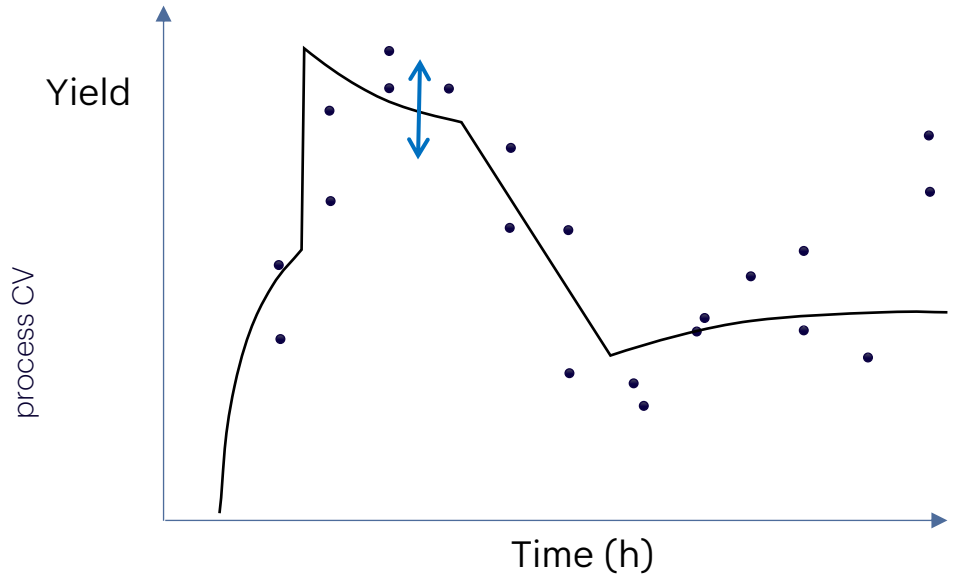


XX% yield drop
12 months transfer time

Solution: data integration & analytics delivered process quality

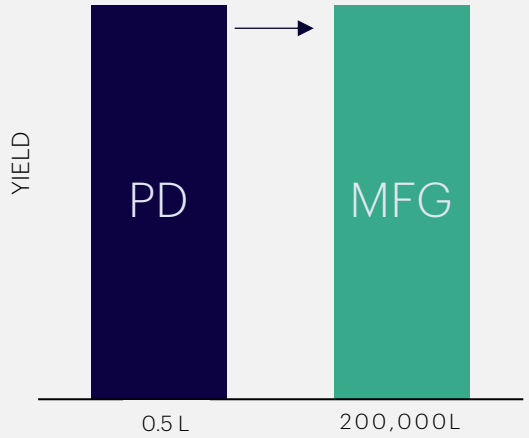
Improved data then uncovered root-causes of scaling problems

Typical PD Batch after quality campaign



LOW NOISE / CONTROLLED PROCESS

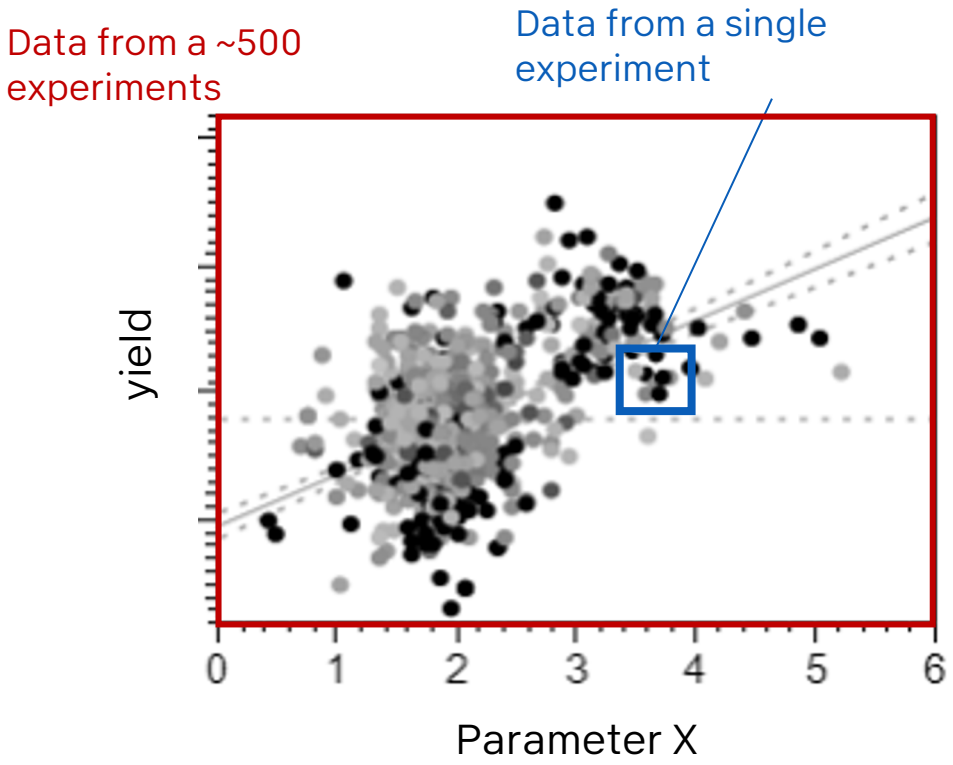
Scale-up outcome



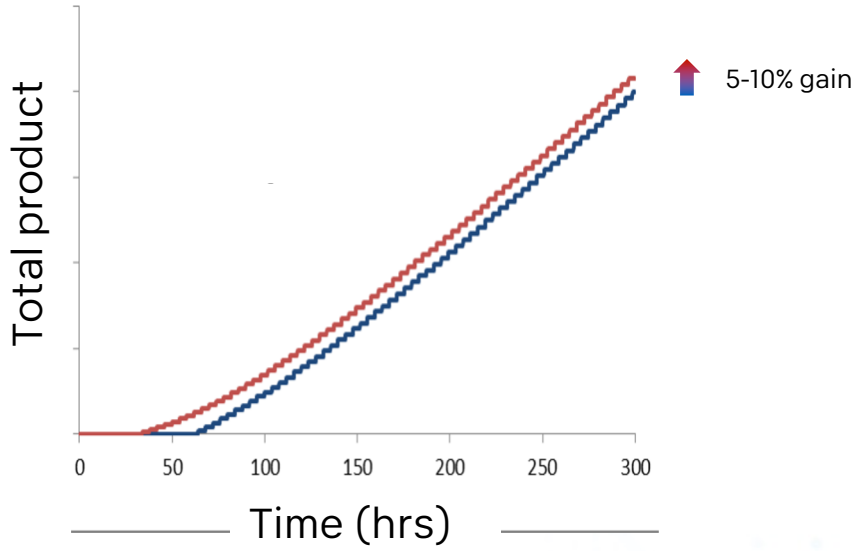
Exact performance match
3 months transfer time

Quality data is a building block for machine learning

Data aggregation revealed latent correlations that delivered cost-free gains in manufacturing output



Mining of 500 aggregated experiments delivered a cost-free 5-10% gain in productivity



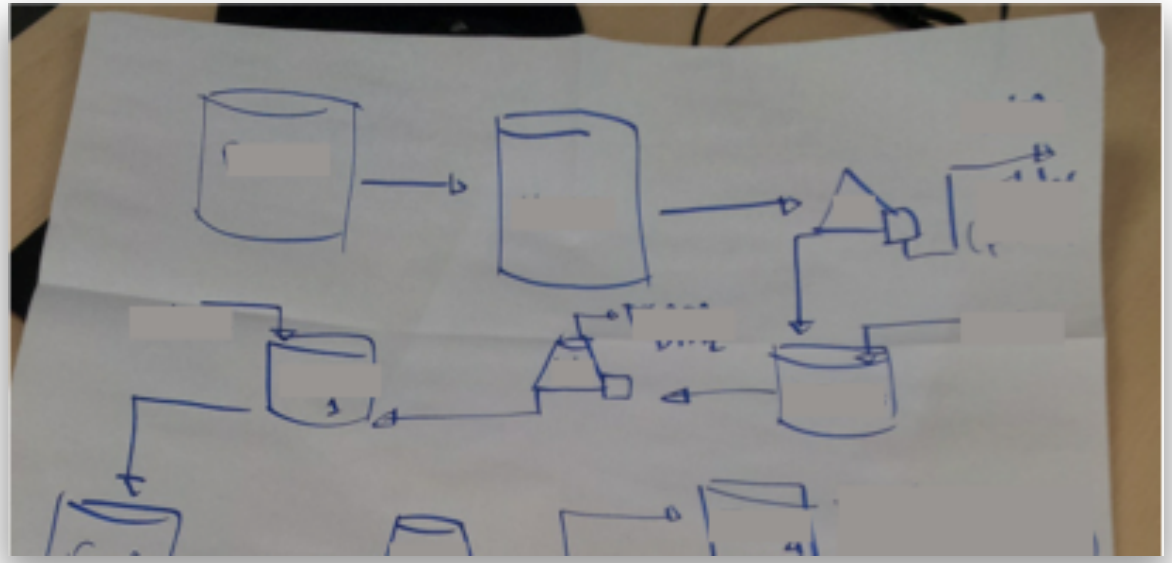
See *JMP Foreward* for JMP 16 for the story of "Just add water" (also posted online at jmp.com)

Traditional data systems and practices are failing us

They don't deliver the **process context** or **data integration** needed for machine learning

"It often takes us 2-3 months to assemble the data from a single development batch"

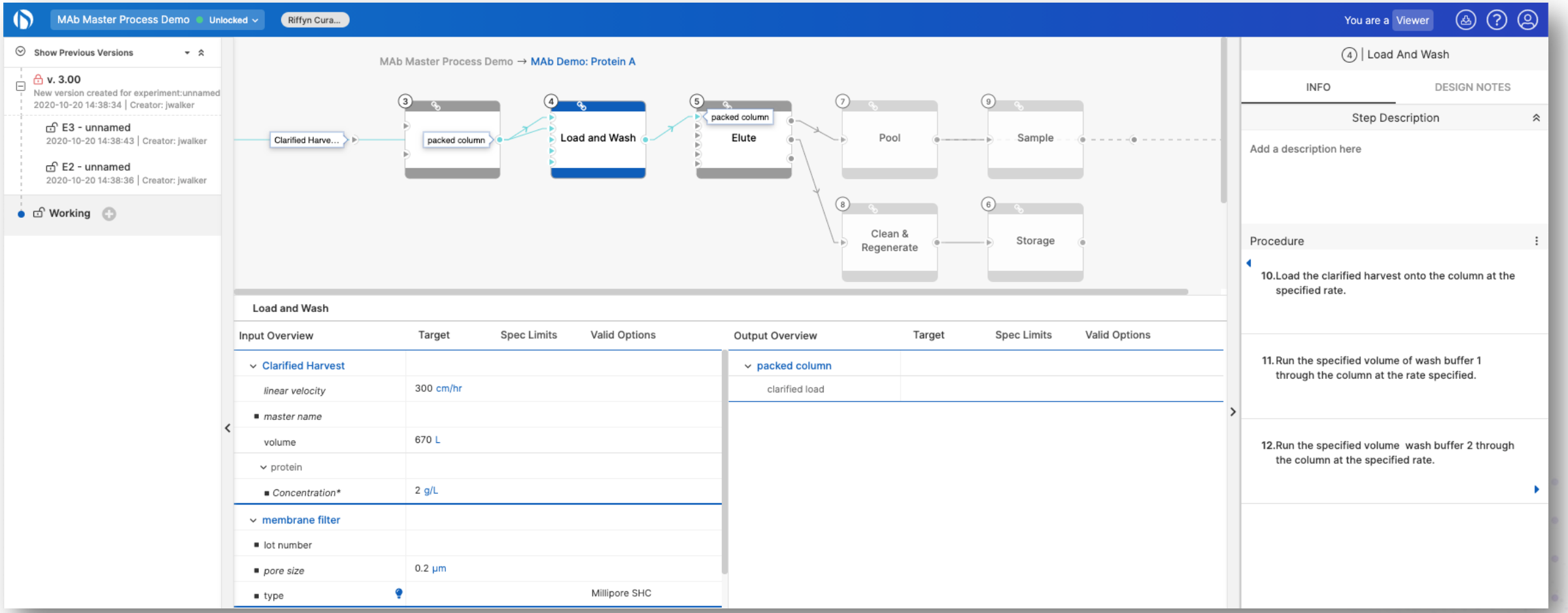
- senior scientist global pharmaceutical company



"We change what we know not what matters"

Riffyn Nexus: a process-centric approach to R&D

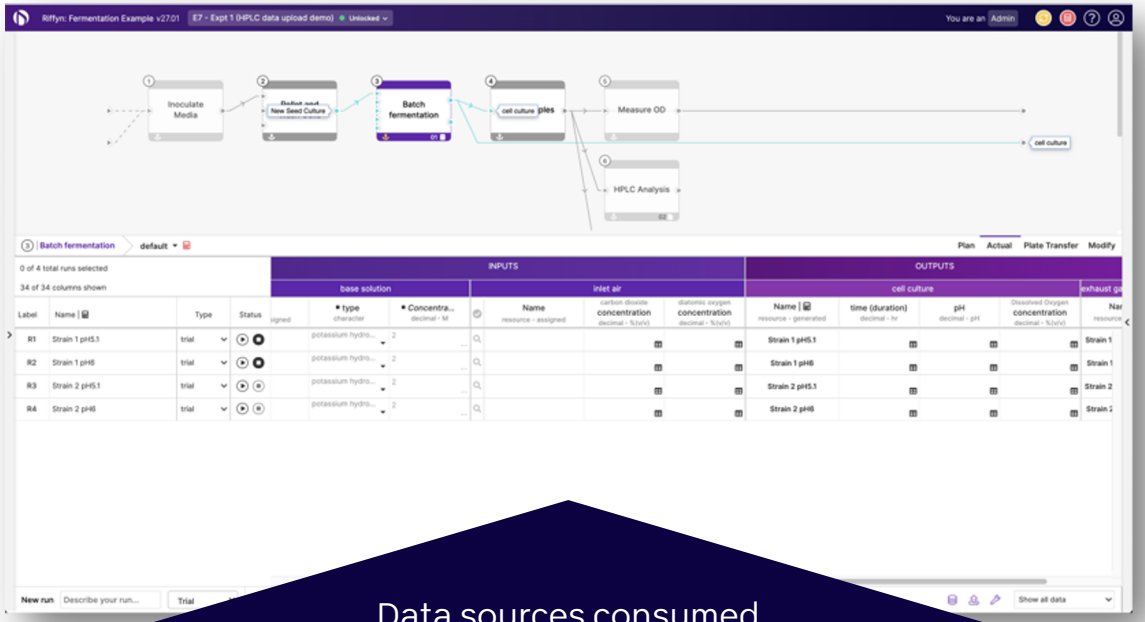
Built to support process development in biopharma & industrial biotech



Analysis-ready data in real-time

Data is contextualized on collection into a flexible, versioned process model for aggregate analysis

1. Process design → **2. Execution & data capture** → **3. Data linking & contextualization** → **4. Analysis** (external tools)



Data sources consumed

Excel Historian API Scripts Media

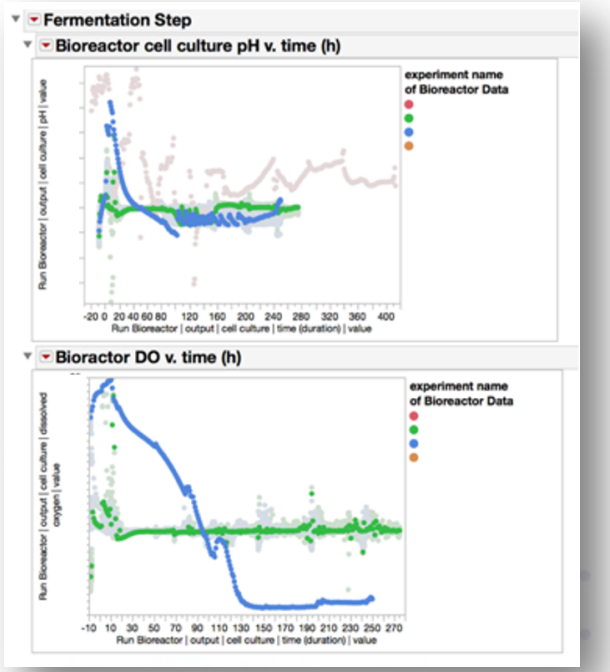
Experiment 4

Experiment 3

Experiment 2

Experiment 1

Contextualized & aggregated data



Automated & instant data integration delivers insight

Material traceability & process context

Always structured & integrated data

leads to

Dramatic time savings

Novel insights from correlated data

How customers are using Nexus to accelerate R&D innovation

Biofuels strain development

novozymes

2X faster project

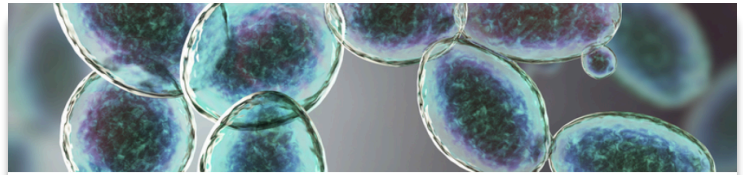
Read the story >

Translational medicine / molecular assays

25% less effort

Read the story >

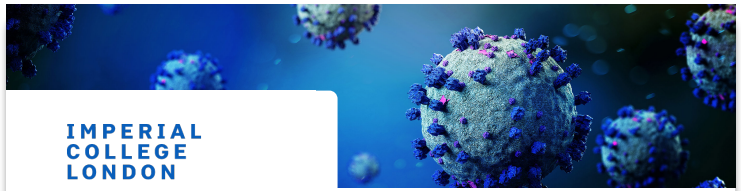
Fermentation



20X faster data prep

Read the story >

Clinical assays



IMPERIAL COLLEGE LONDON

9 weeks to clinic

Read the story >

Solid dose formulations development

16h saved / batch

Read the story >

Veterinary health

80% fewer animals

Read the story >