



Big Cheese Data

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Say cheese !

SayCheese is a 3-year 4.5M DKK research project between

- KU FOOD
- ARLA Foods Taulov Dairy
- ARLA Foods Høgelund Dairy

Funded by MFF and GUDP



UNIVERSITY OF
COPENHAGEN



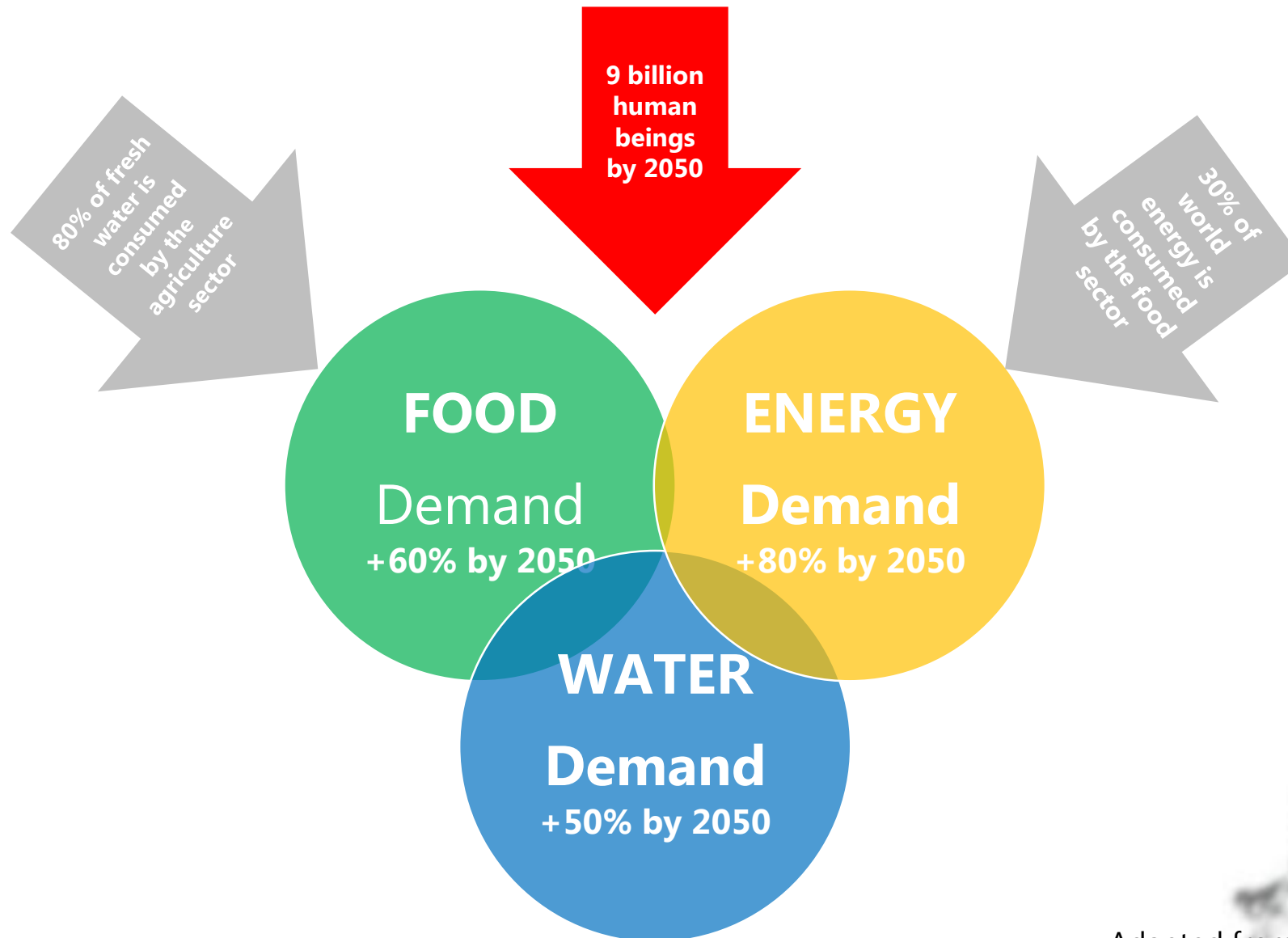
Motivation

- 446.700 ton of cheese produced in 2017 ¹
- We estimate that at 1-2 m³ of water can be saved per ton of cheese by reuse of water
- Obvious savings
 - procurement costs of tap water
 - disposal costs for wastewater
- Potential for valorizing side streams



¹ Landbrug & Fødevarer, Mejeristatistik 2017

Motivation





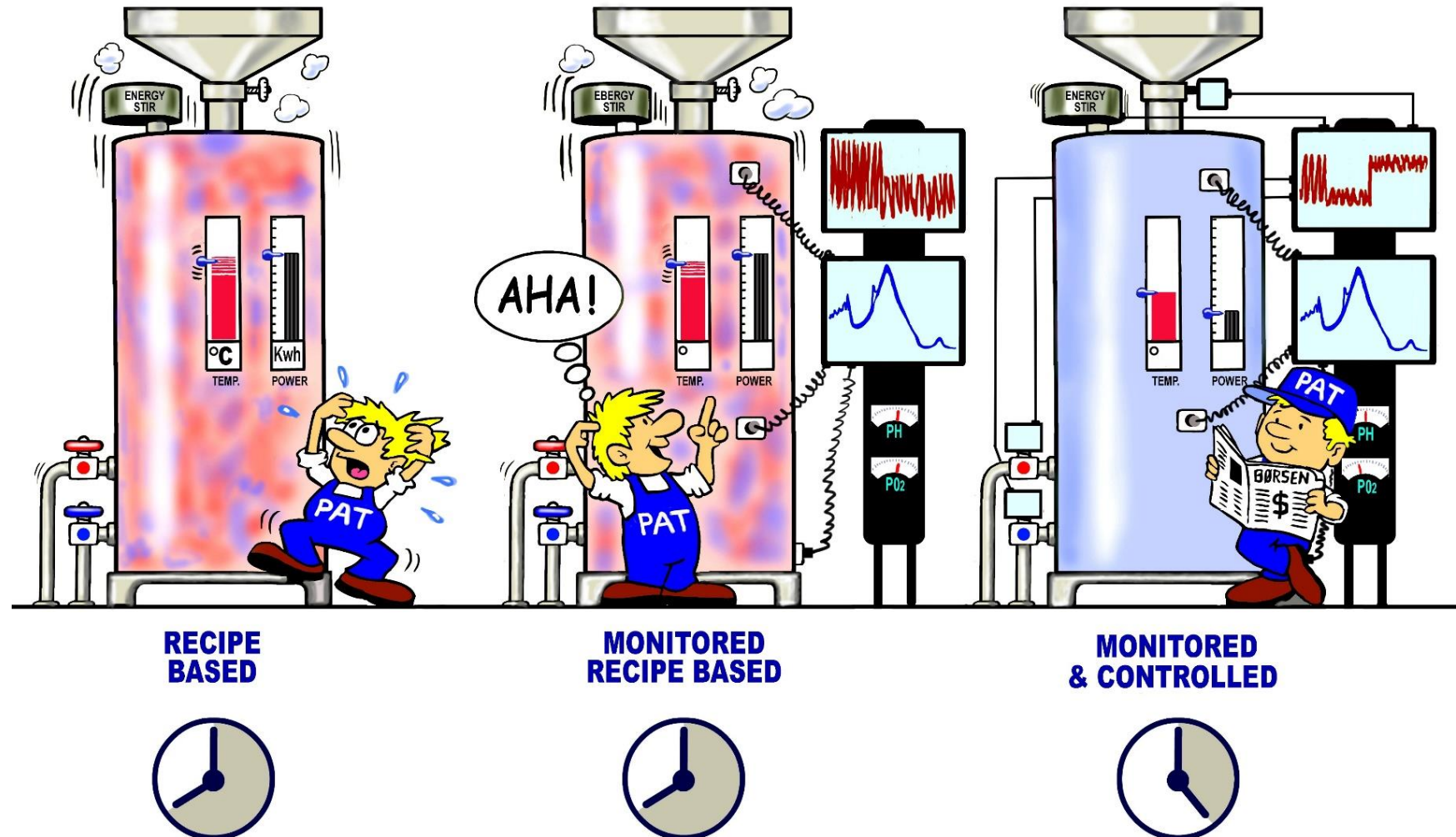
The enabler for process water reuse :
To never compromise
Product Quality or Safety

*‘**Measurement** is the first step that leads to control and eventually to improvement. If you can’t **measure** something, you can’t understand it. If you can’t understand it, you can’t control it. If you can’t control it, you can’t improve it.’*

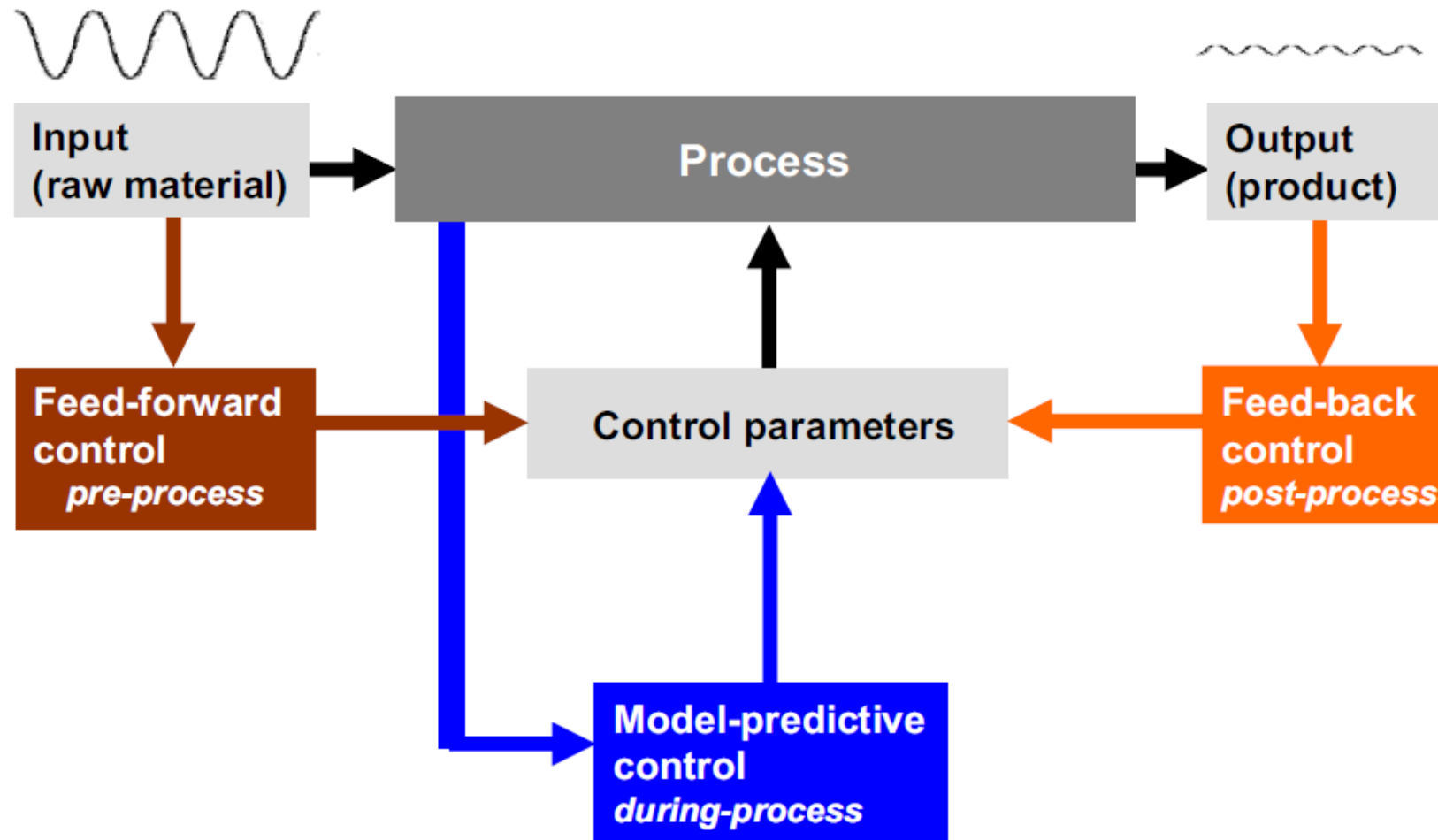
— H. James Harrington



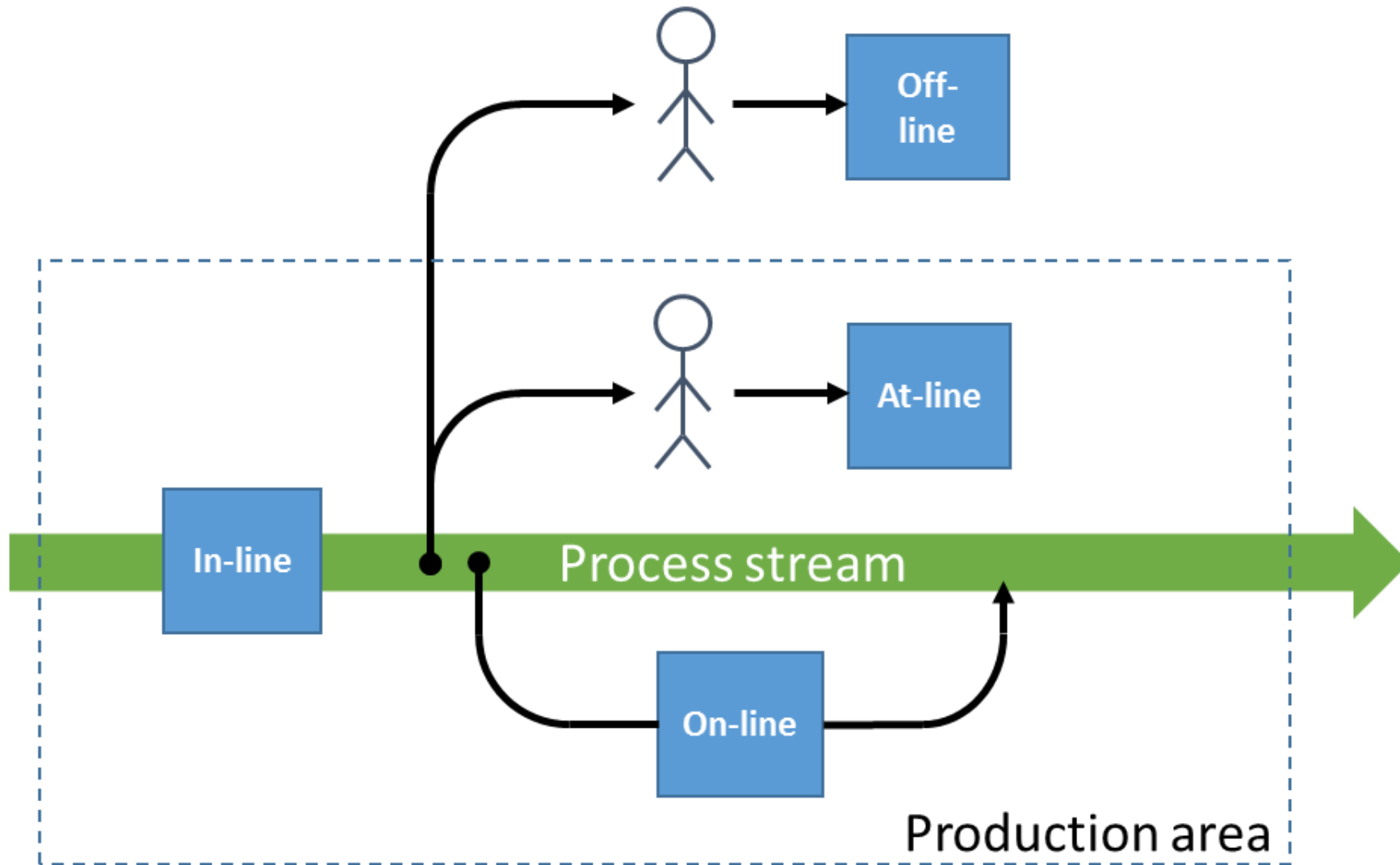
PAT – Process Analytical Technology



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Near-infrared spectroscopic analysis equipment

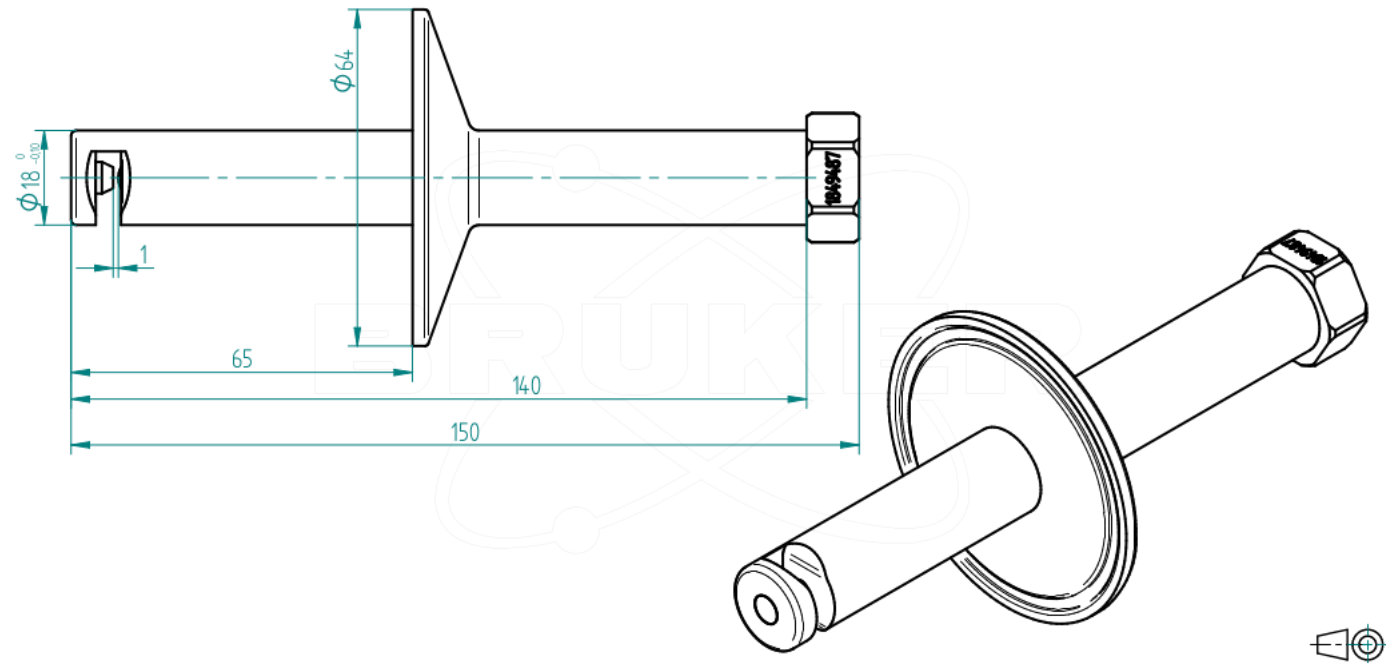


Near-infrared spectroscopic analysis equipment - online



NIR transfection probe IN271F-02 modif.
1849487

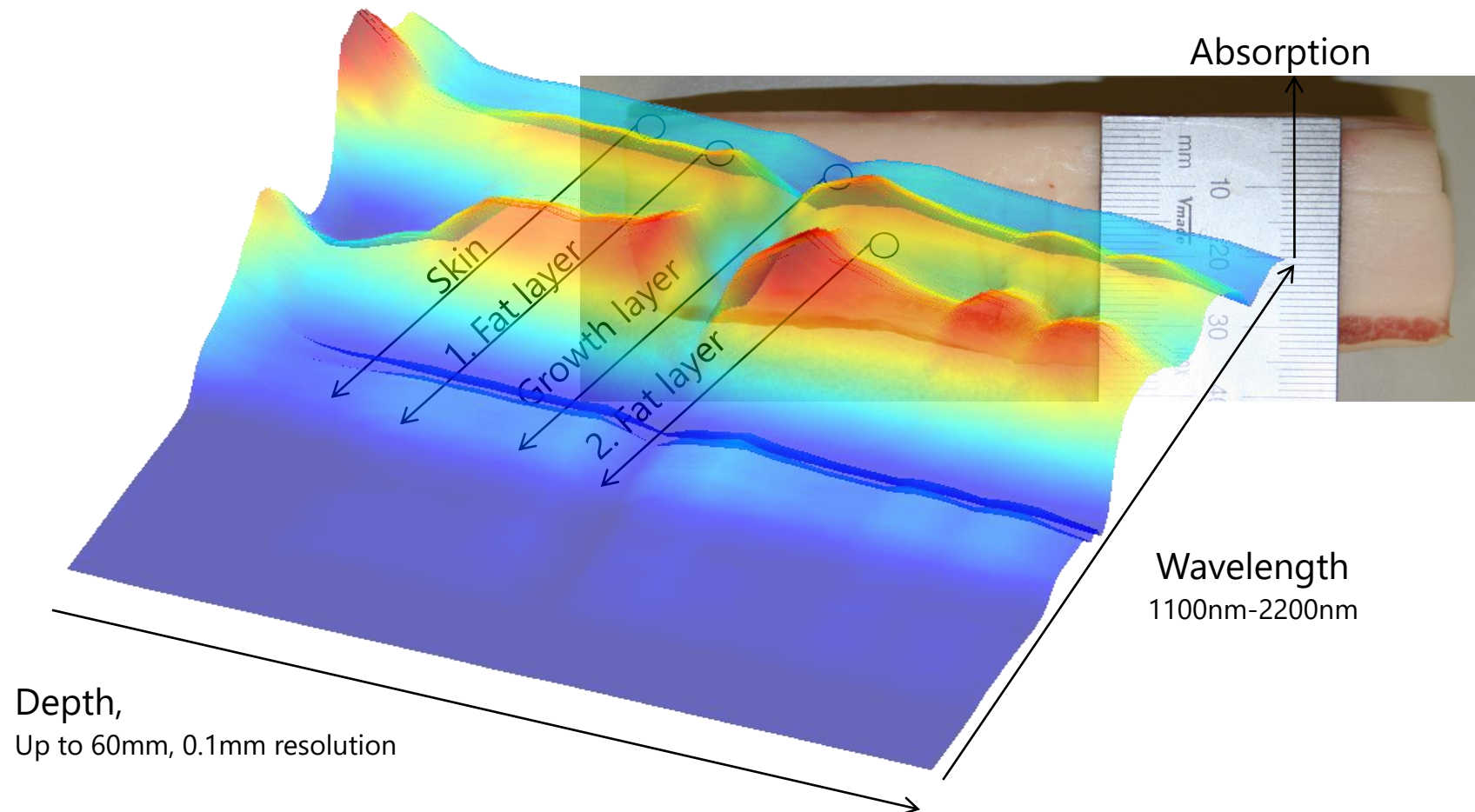
Bruker Optik



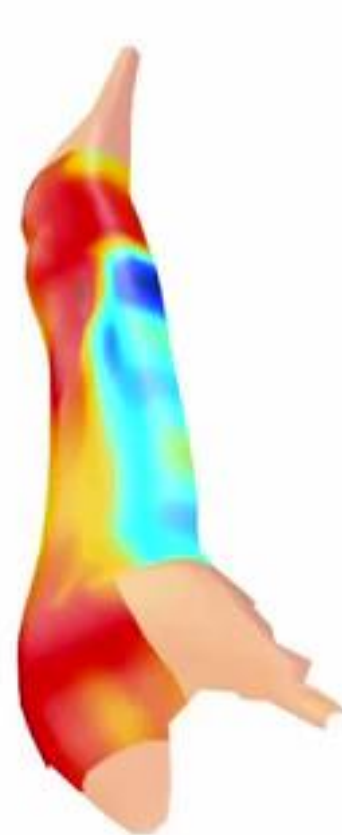
Measuring non-trivial products on-line



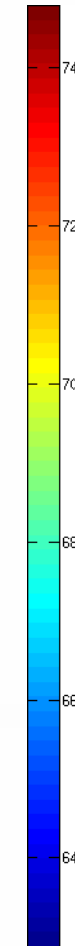
Spatially resolved NIR measurements



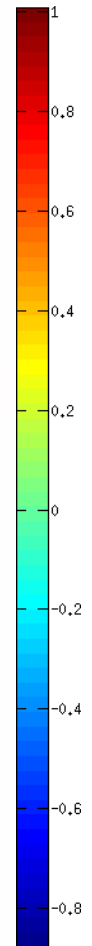
Topological mapping of quality in slaughter pigs



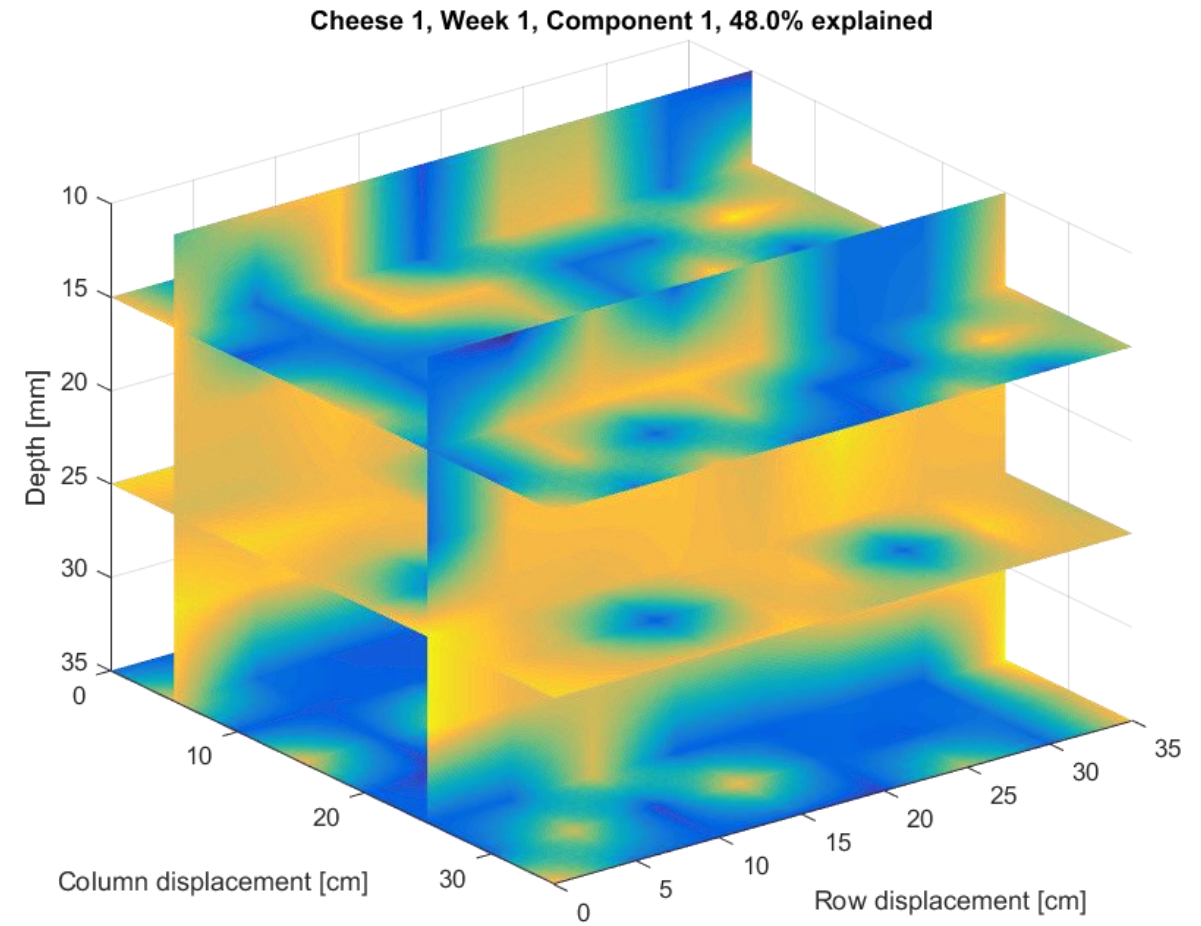
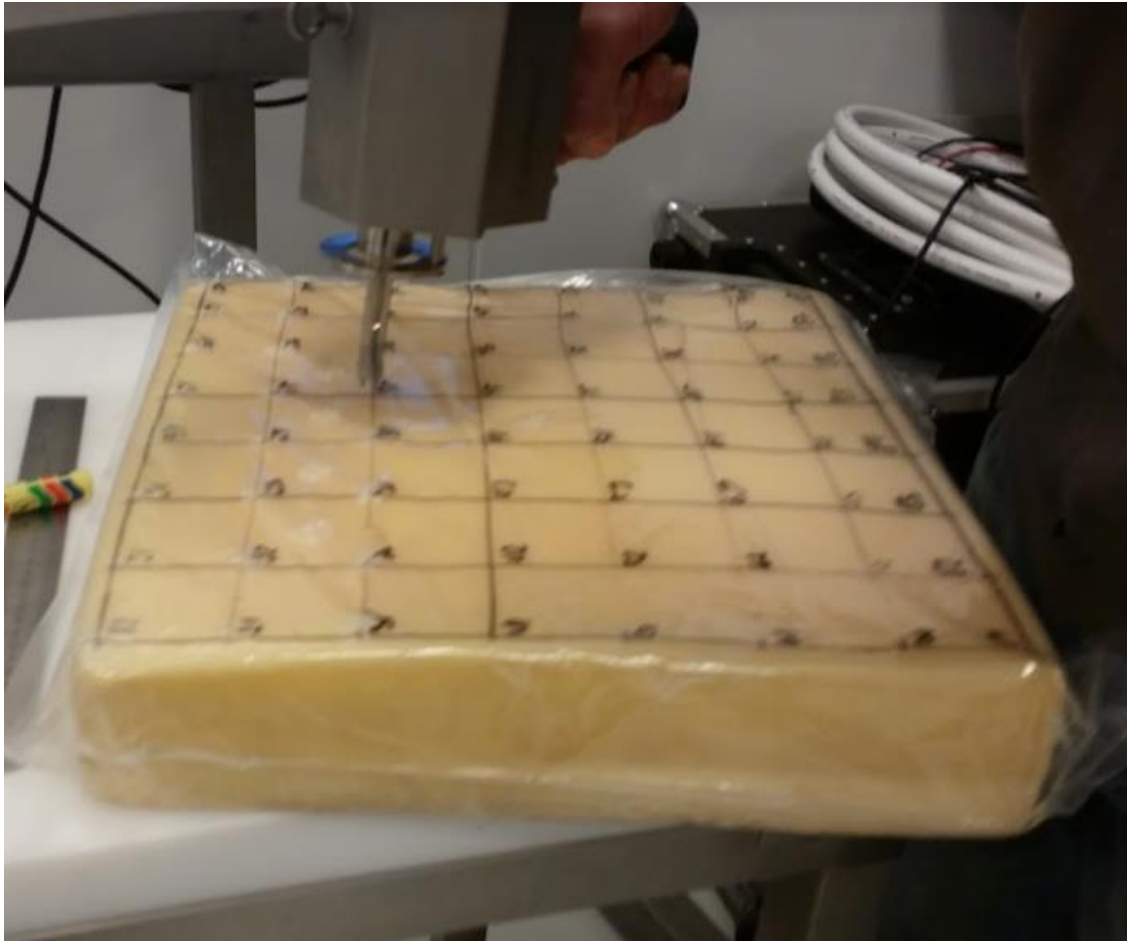
Average



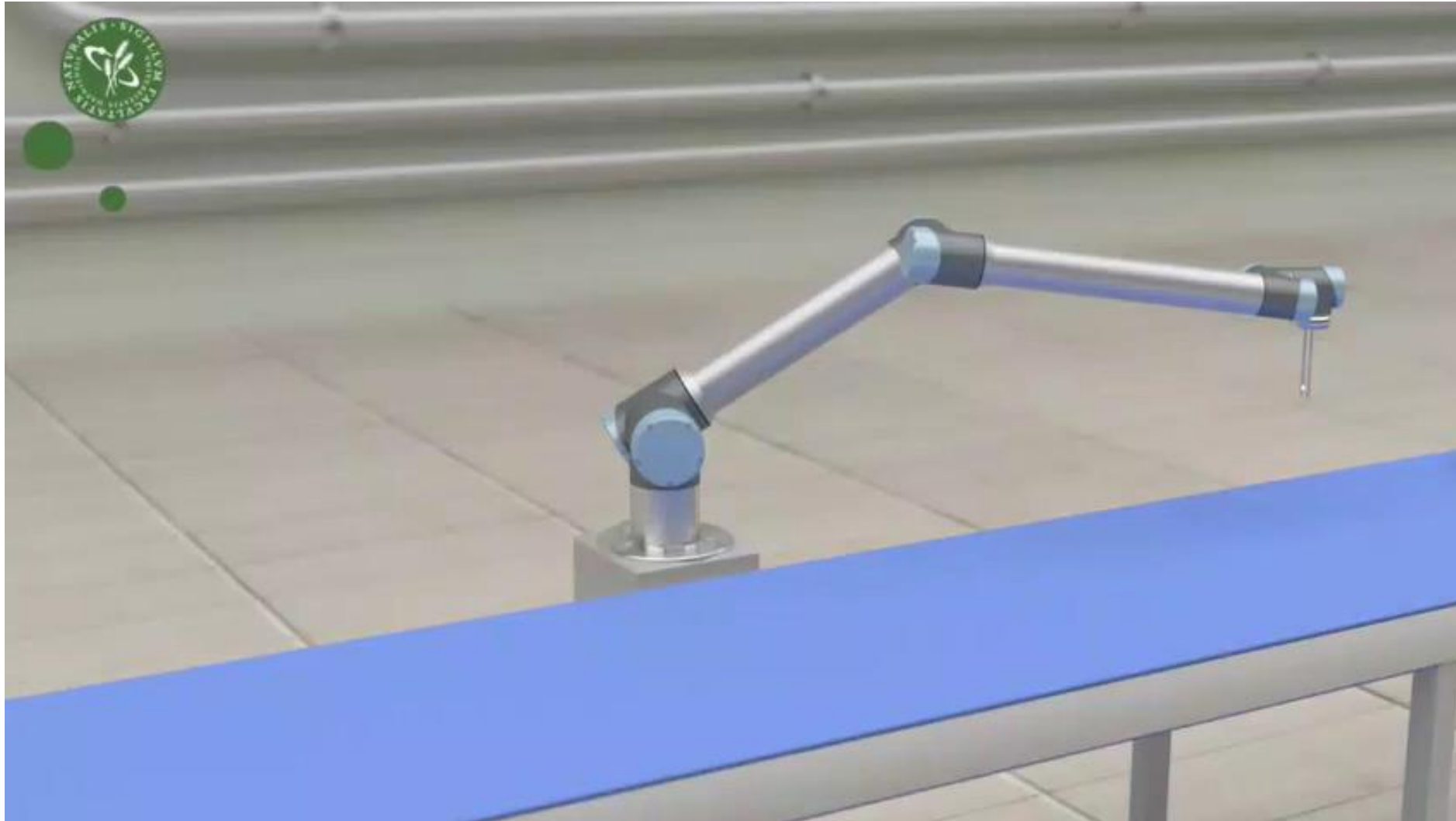
Neck- to body correlation



Topological mapping of a cheese



SayCheese: Automated on-line measurement of cheese



SayCheese - Building Big Data

Topological description of cheeses

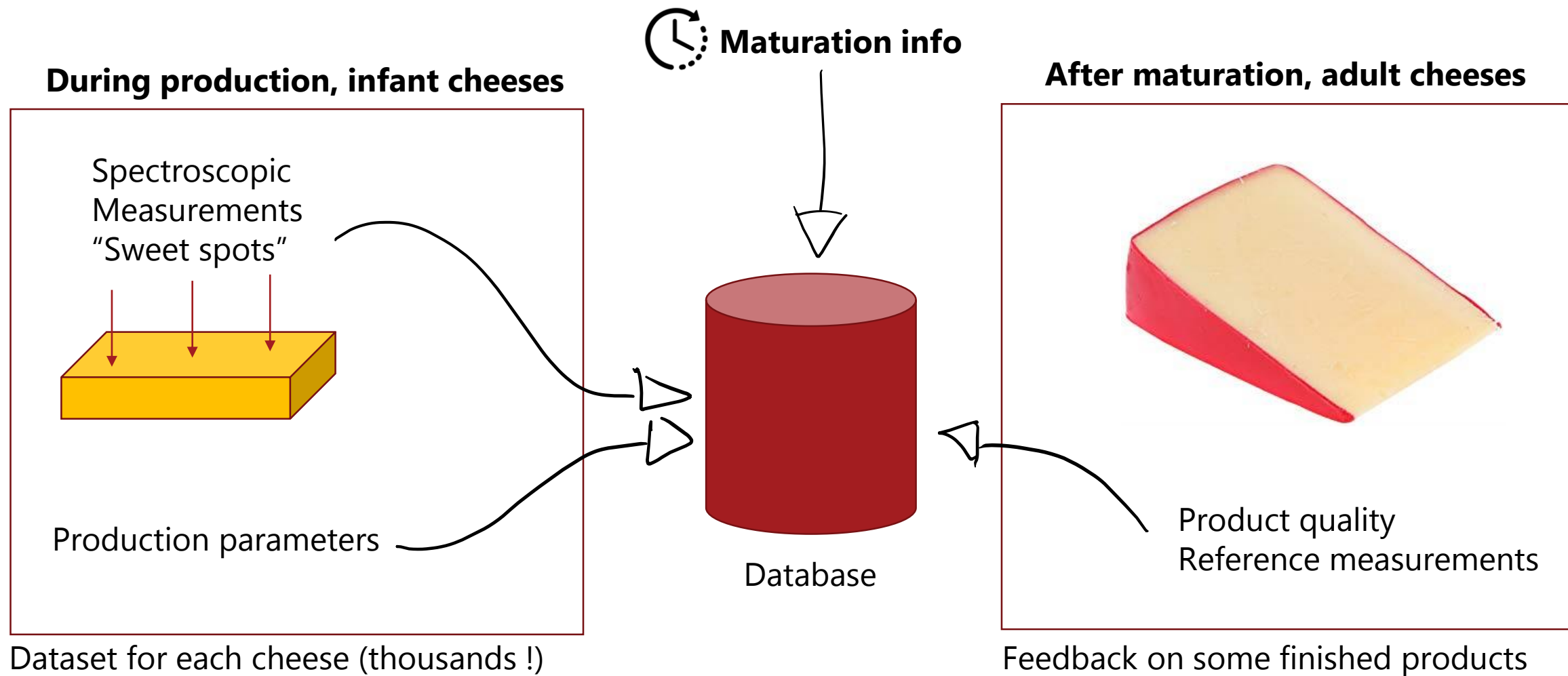
- Measured as infant cheeses
- During maturation

Spanning a huge space of variation

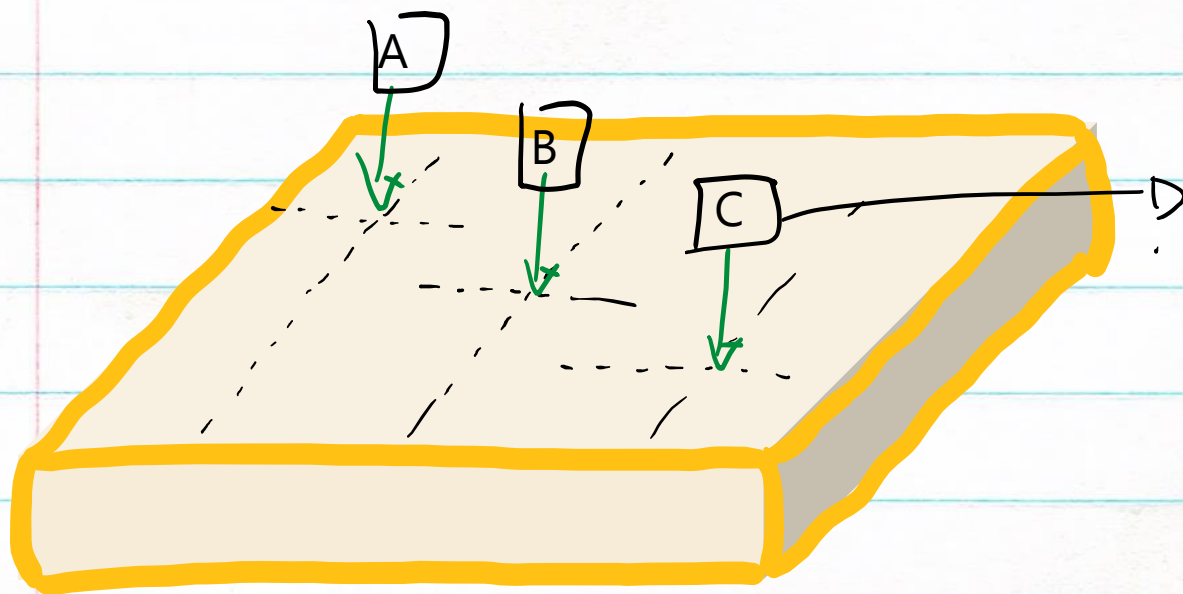
- Different raw materials
- Seasonal variations
- Equipment configuration
- Recipes
- Water reuse
- End product quality



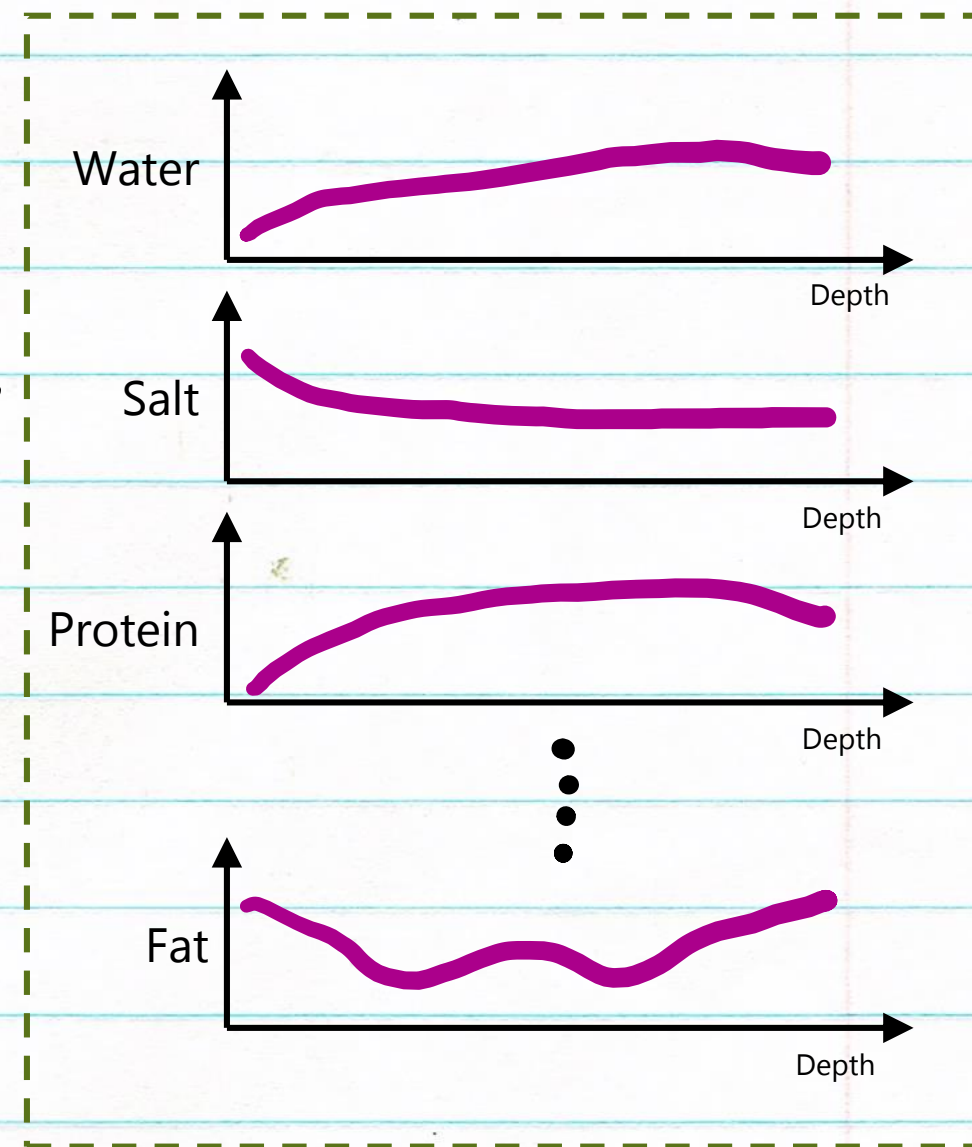
SayCheese - Building Big Data



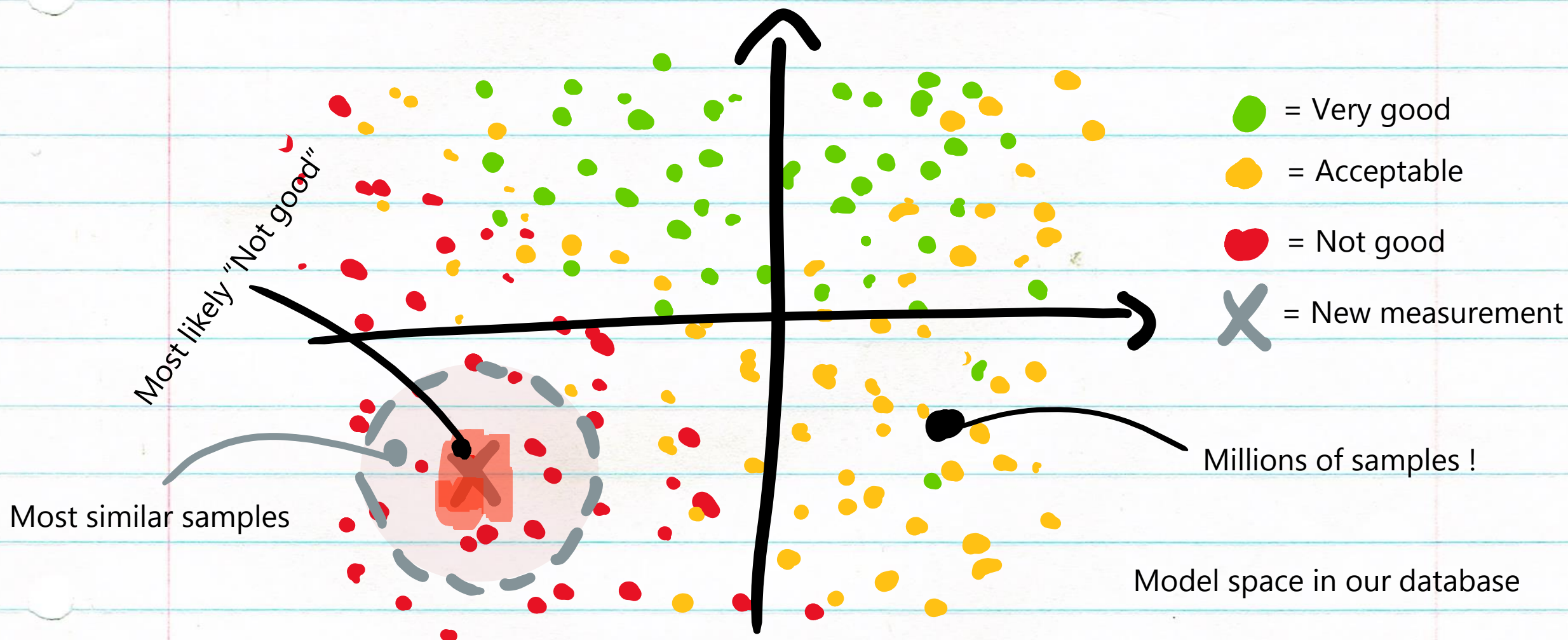
Topological cheese description



"Production fingerprint"



SayCheese – predicting matured cheese quality



Thank for your attention !

Please contact me for further info, or if you have comments or suggestions !

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