

Integrating JMP data exploration and python machine learning capabilities

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Confidential



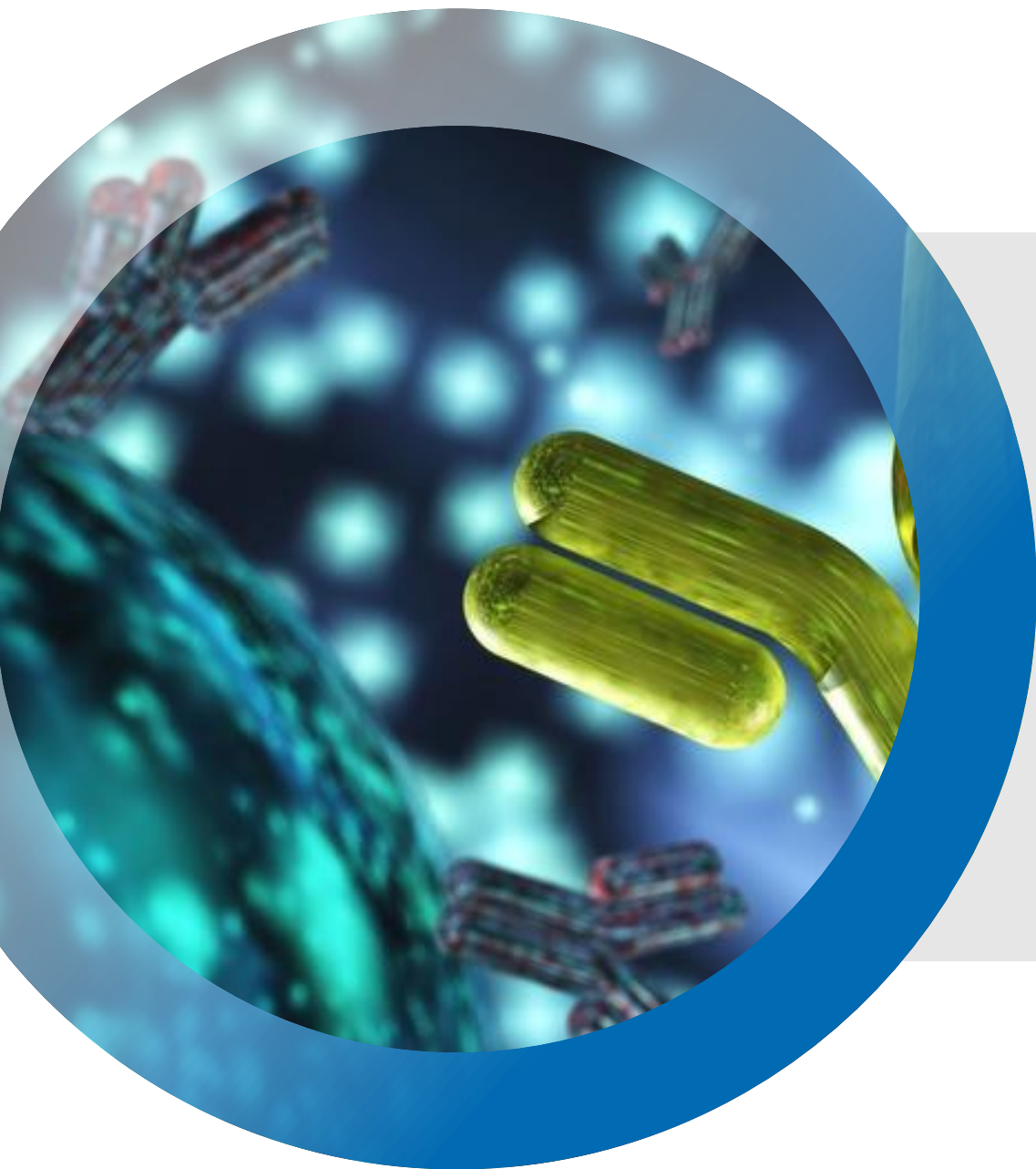
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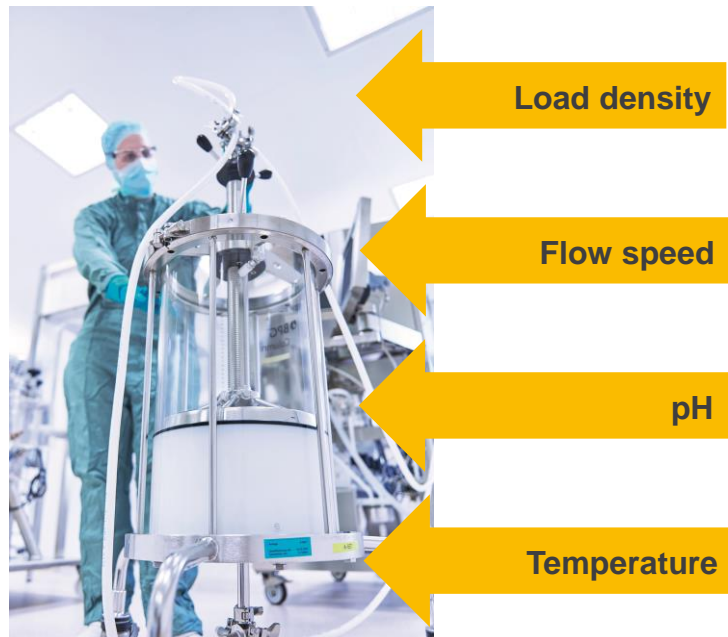
Our aim is to understand and improve the production of biopharmaceuticals

To deliver the best quality, we have
to understand the production
process



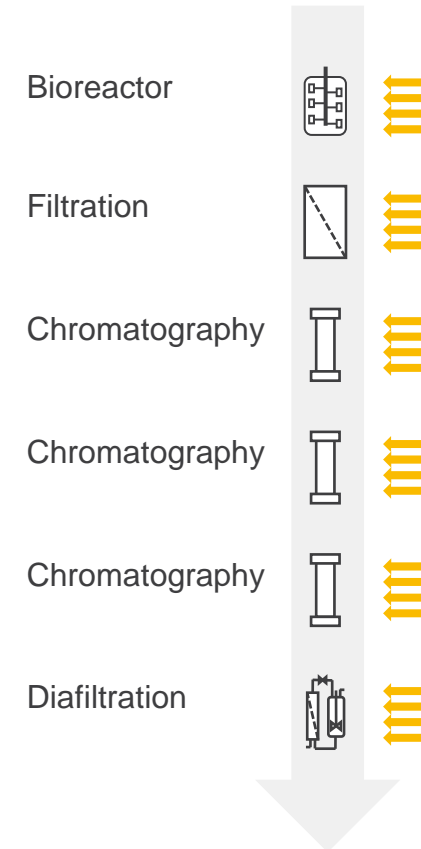
Many parameters influence the product quality

Every production process step is influenced by many factors



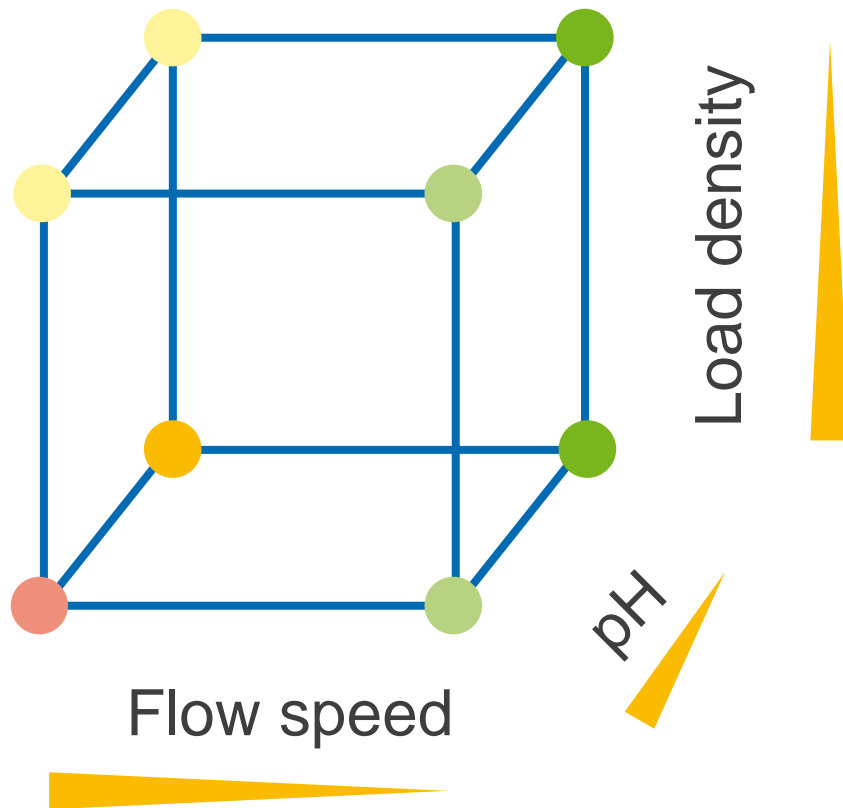
Example Chromatography column

Every biopharmaceutical production process consists of many process steps



Example excerpt from a production process

Typical approach



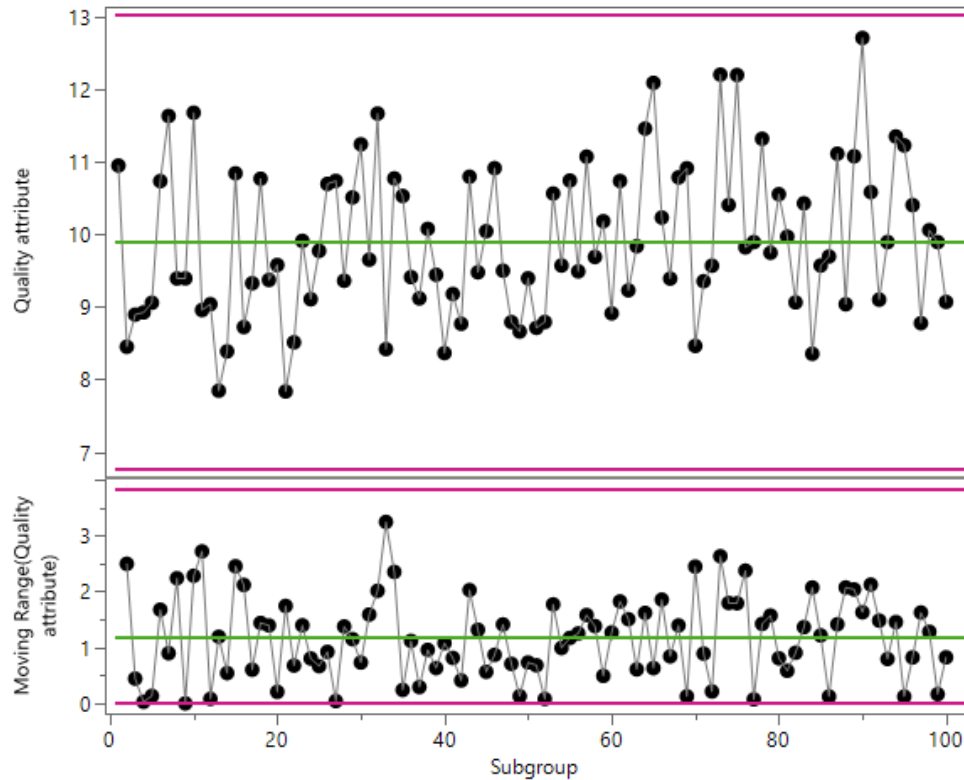
During process characterization we work with DoE

The investigated parameters depend on the understanding of the process at the time of process development

Machine learning can help us identifying factors in large datasets

Control chart

During commercial manufacturing many more datapoints are generated



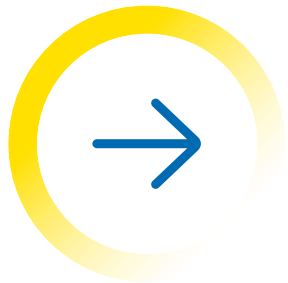
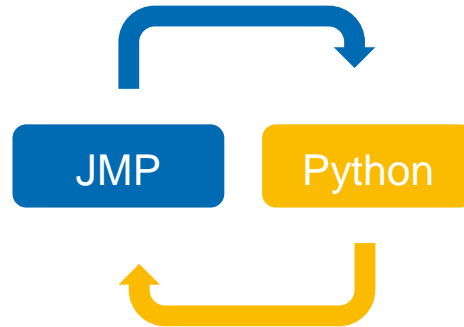
Example, random data

Most SMEs are unfamiliar with machine learning

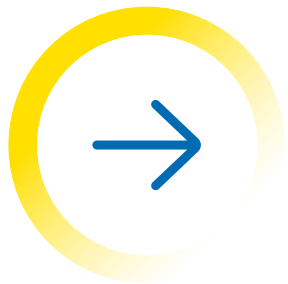
Most statisticians are unfamiliar with biological processes



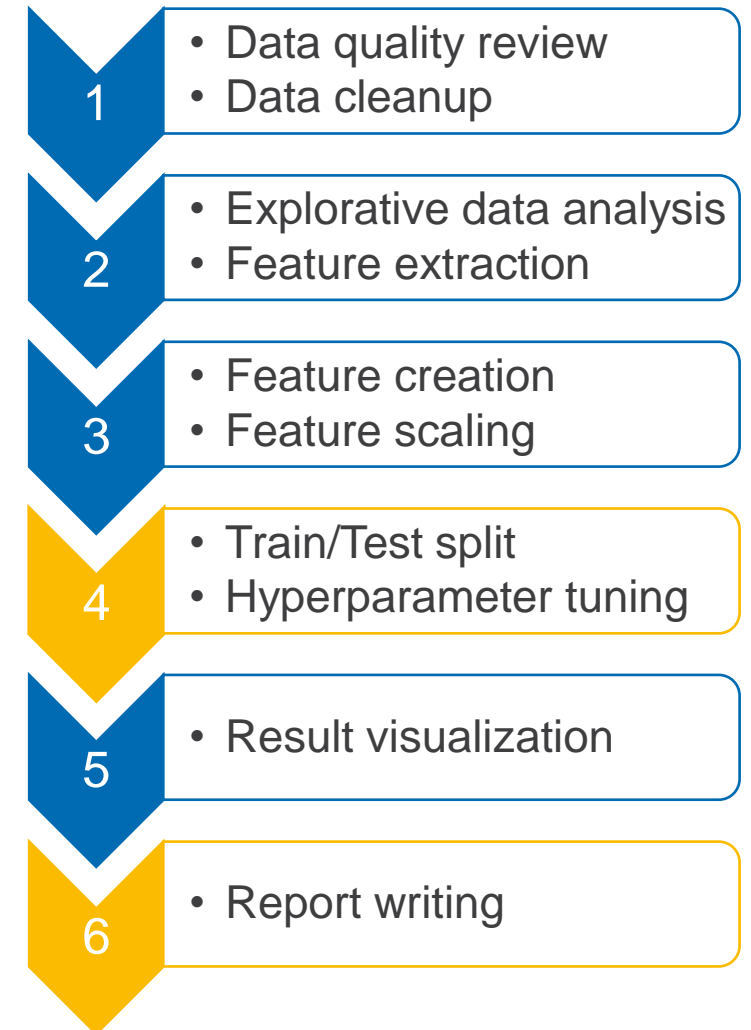
Most work on a machine learning project is best done by experts of the process



JMP is ideal for most tasks requiring process experts

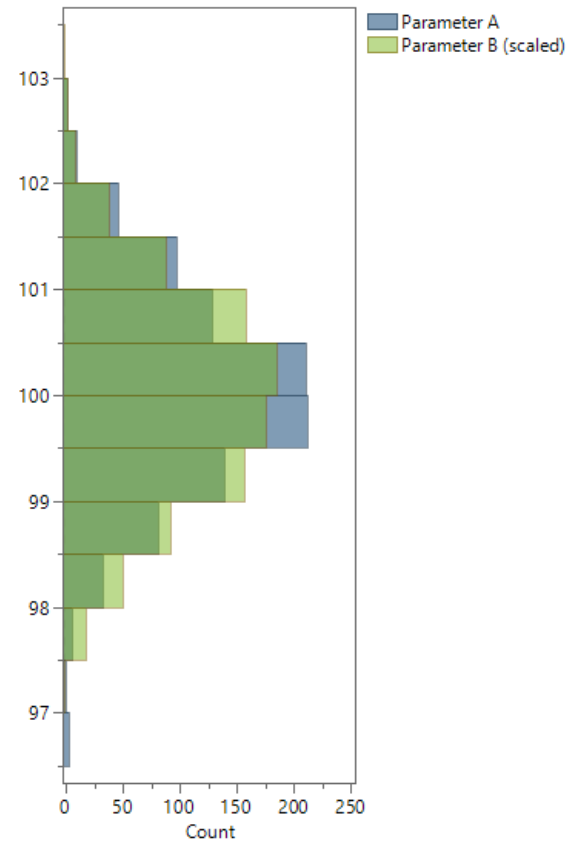
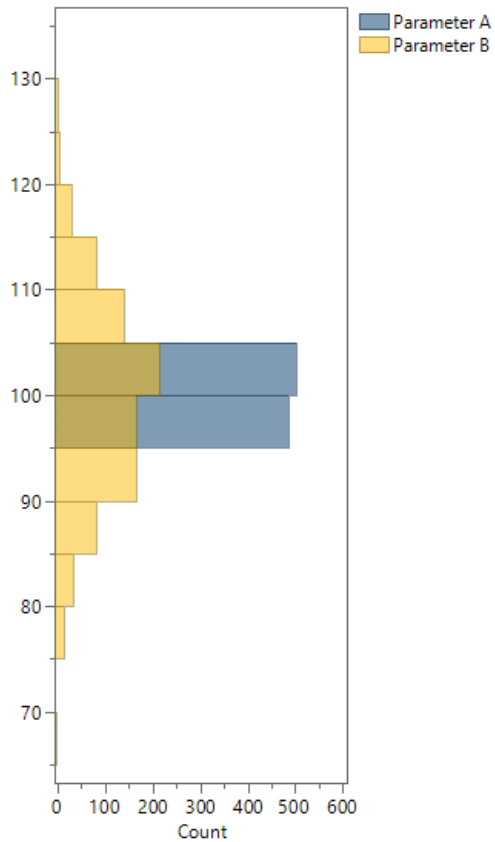


Python is ideal for machine learning task



Simple data manipulation tasks are automatized with JMP

Parameter scaling



Parameter scaling ensures that all parameters have equal weight in the model

Example, random data

The end users do not notice if JMP or python code is used

JMP journal for machine learning tasks

Process experts can use python via JMP journals



Machine learning

Purpose: use machine learning algorithms to identify the factors impacting a parameter

Use JMP for data visualization and preparation, and Python for machine learning.

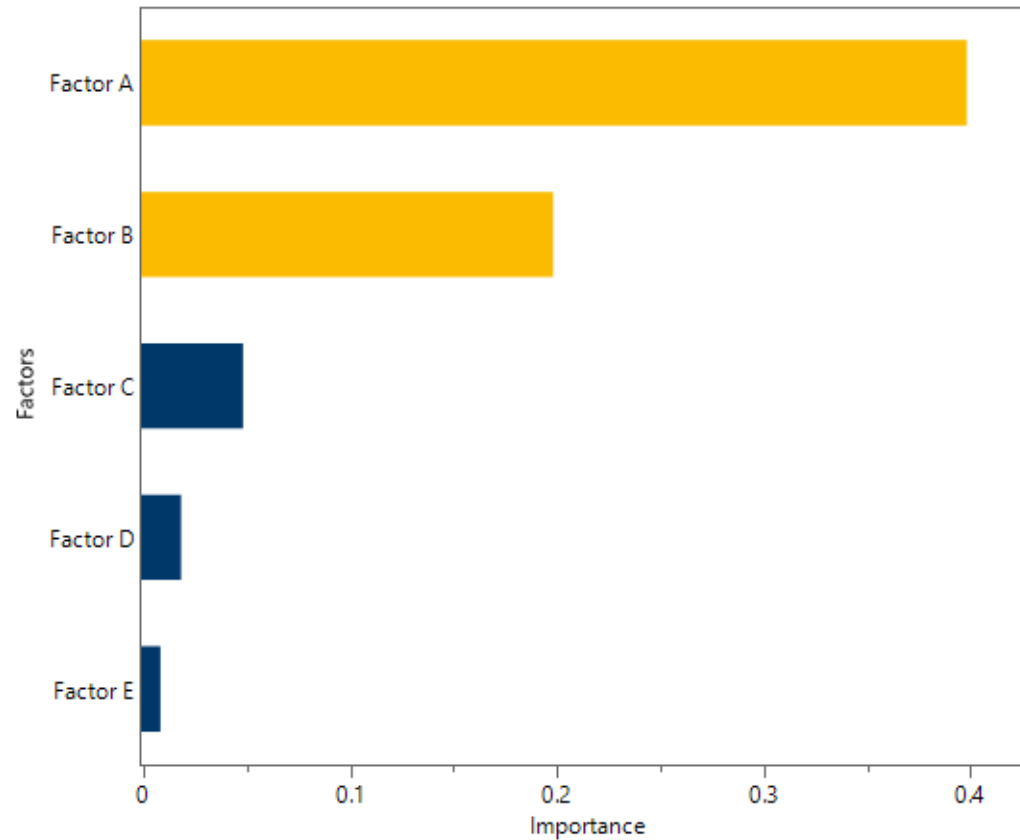
For questions or comments please contact [Ole Herud-Sikimic](#)

- ▷ **Data formats**
- ▷ **Fill missing data**
- ▷ **Feature creation and scaling**
- ▷ **Model generation**
 - Model definition
 - Parameter screening
- ▷ **Result visualization**
- ▷ **Report generation**

Demonstration

Parameter screening

Machine learning can help to identify the factors most relevant for the prediction



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