Applying Big Data Analytics in Bioprocessing

2-day course | London | 25-26 November

BioProcess International Academy

Your Course Leader - Dr. Michael Sokolov

Dr. Michael Sokolov is co-founder and COO of DataHow AG, a spin-off company from ETH Zurich specialized on process data analytics and modeling with a particular focus on the biopharmaceutical and chemical domains. He also holds a lecturer position for statistics for chemical engineers at ETH.

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Day One Agenda

Session 1: Introduction to Big Data and Data Analysis

- What is Big Data
- Motivation for collecting Big Data in Bioprocessing, i.e. improve business efficiency and reduce costs and time to market
- Big Data management
- Available software for Data management and analytics
- Multivariate analysis

Session 2: Specialties of Bioprocess Data

- Specialties of bioprocessing data and the important steps required for bioprocess data analysis
- Brainstorming session
- Principal component analysis – the theory and industry examples

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Day One Agenda

Session 3: Available Software for Big Data Analysis and Linear Statistical Models

- Software demonstration of Principal component Analysis
- Brainstorming session
- Linear regression models, such as multiple linear regressions (MLR), Principal component regression (PCR) and Partial Least Squares (PLS)
- Design of Experiments (DoE) – the theory and industry examples, including from upstream processing, downstream processing and Process Analytic Technology (PAT) cases

Session 4: Industrial Application Cases and Limitations of Linear Statistical Models

- Software demonstration and brainstorming of Linear Regression modelling and its interpretation
- Limitation of linear models
- Motivation to use machine learning and hybrid modelling (industry cases included)
- Questions & Answers

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Day Two Agenda

Session 5: Introduction to Machine Learning

- Theory of Machine Learning and how it works
- Examples and use cases

Session 6: Machine Learning Software and Applications

- Demonstration of machine learning software
- Linear modelling vs machine learning, pros and cons
- Bioprocessing and PAT Applications
- Brainstorming

Session 7: Hybrid Modelling

- Introduction to Hybrid Modelling
- Bioprocessing use cases from USP and DSP
- Hybrid modelling software demonstration

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Day Two Agenda

Session 8: Current State of Play, Challenges and Industry Future Outlook

- Additional motivations for using Big Data models across the entire bioprocess (process screening, process scale-up, process characterization and optimization)
- Big Data and continuous manufacturing
- Current industry challenges in implementing Big Data models and ways to overcome these in the future
- Questions & Answers

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For information or to book a course
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