ETH zürich

Short course on

Advanced Multivariate Process Data Analysis

23rd – 25th September 2019

Aim

The aim of this course is to provide an overview and advanced insight into data analytics and modeling methodologies to for process data. Fundamental concepts to visualize high-dimensional and highly correlated process and product quality data, to identify the important process drivers as well as to forecast the process and product quality behaviour will be presented in lectures. Hands-on sessions and a team project will be used to solve case studies from the (biopharmaceutical) industry. After the course the participants will be aware of relevant techniques and literature for process data analysis and will be able to evaluate different analysis paths for a given problem.

Scope

- Introduction to multivariate data analysis
- Advanced analysis techniques for process data
- Model-based process analysis and optimization
- Model-based process monitoring and forecasting
- Introduction to machine learning techniques
- Hybrid process modeling based on process data and process know-how
- Application of techniques to industrial use cases

Who should attend

The target group of the course encompasses scientists and engineers from academia and industry who encounter or are working with (big) process data. The course shall motivate to utilize the presented techniques in ongoing and perspective projects. Previous experience in data analysis can be advantageous but is not mandatory to follow the course.

Format

The course takes the form of lectures, case studies and 'hands-on' workshops in a computer lab. Supervisors and graduate assistants will support the participants during the interactive workshops and data analysis sessions.
The course will be intense in content, interactive in learning and interdisciplinary in application and vision.

"There were 5 exabytes of information created between the dawn of civilization through 2013, but that much information is now created every 2 days."

Eric Schmidt, CEO of Google

ICB Institute for Chemical and Bioengineering

Course Host

Massimo Morbidelli**,** *Professor at Institute of Chemistry and Applied Biosciences (ICB), ETH Zurich.*
A pioneer in modeling chemical and separation processes as well in continuous integrated bioprocessing, Prof. Morbidelli has co-authored over 500 research articles and four books. He serves as associate editor for the Industrial & Engineering Chemical Research journal of the ACS and is the recipient of the 2005 RH Wilhelm award from the AIChE and of the 2014 Gerhard Damkoehler medal of DECHEMA.

Principal Lecturers

Michael Sokolov, *PhD*, COO of DataHow and *Scientist and Lecturer at ICB, ETH Zurich*
Michael Sokolov is an expert in bioprocess modelling and regularly presents his work on international conferences and workshops. He co-authored multiple publications in the field of the selection, prediction, optimization, monitoring, forecasting and validation of cell culture processes.

Alessandro Butté, *Ph.D., CEO of DataHow and Lecturer at ICB, ETH Zurich*
Besides a long-standing research experience in polymer, separation and biotechnological processes, Dr. Butté has several years of experience in the pharmaceutical industry and a MBA from St. Gallen. He is a co-author of more than 60 publications and 4 patents.

Further Lecturers and Tutors

Nicolas Cruz, *Modeling and automation expert*
Gianmarco Polotti, PhD, *Chemometrics expert*
Fabian Feidl, PAT expert
Joao Almeida, Machine learning expert
Martin Luna, PhD, DoE and optimization expert
Harini Narayanan, Hybrid modelling expert

Venue

The course will be held at ETH Zürich (ETH Hönggerberg site) at the modern and well-equipped chemistry building (full address on last page).
Zürich is the largest town in Switzerland and well-connectd to the rest of Europe. ETH is minutes from both the main international railway station Zürich Hauptbahnhof and Zurich International Airport.

Course Program

A preliminary program is provided in a separate document. It will be a three-day event from Monday, 23 Setember, morning to Wednesday, 25 September, late afternoon. The detailed program will be finalized in August 2019. The course will combine a pre-course on multivariate methods on the first day and a two-day course on advanced process analysis methods on days 2 and 3.

Course fees

The course fee is CHF 2’500 (CHF 1’600 for academia and 900 for students). A 20% fee reduction is offered if only the advanced two-day course is attended without the pre-course on the first day (cf. preliminary program). The fee includes lecture and case study summaries in paper and electronic formats, internet access (WIFI), lunch and coffee breaks as well as the social program on the course days. It does not include accommodation, travel costs or catering other than indicated above.

Terms of condition

Confirmation: A confirmation of participation will be provided to each participant after completing the course.
Number of participants: A minimum of 8 and a maximum of 20 participants will be accepted in the course.
Cancellation policy: Cancellation of registration must be submitted in writing or via email and is valid only with acknowledgement of receipt by the course officer. Cancellations made after 1st August 2019 will be subject to a 50% cancellation fee. Cancellations made after 1st September 2019 will be subject to the total fee. A colleague or associate may be substituted without penalty. Full refunds will be made in the case that the course is cancelled due to insufficient enrolment.

“Data is the oil of the 21st century, and analytics is the combustion engine.”

Peter Sondergaard, Gartner Research

Accommodation

With regards to logistics to ETH campus we recommend the following hotels:

Hotel Leoneck (www.leoneck.ch)

Hotel Sunnehus (www.hotelsunnehus.ch)

Disclaiming statements

ETH and the course organisers will not assume responsibility for medical expenses of participants or damage caused by participants.
All participants are urged to ensure that they are covered by their own travel, health and liability insurance policies while traveling to and from and while attending the course.
ETH and the course organisers are not responsible for private possessions lost or stolen at a course.

Registration

Register online via:
https://de.surveymonkey.com/r/ETHBigData2

Early bird discount until July 19th: -10%.

Please contact bigdata@chem.ethz.ch
in case of questions. Registration is only complete after payment. Registration is binding unless the minimum of participants cannot be reached.

To register past the early bird deadline, please write to the course officer at alexia.berchtold@chem.ethz.ch to check if places are still available.

Sponsors

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