ETH zürich

Short course on

Advanced Process Data Analytics
7th – 9th September 2020

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 and brainstorming sessions 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.

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.

Scope

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

Course Host

Gonzalo Guillén-Gosálbez, *Professor at Institute of Chemistry and Applied Biosciences (ICB), ETH Zurich.*

Dr. Gonzalo Guillén-Gosálbez is a Professor of Chemical Systems Engineering at ETH after working several years at Universitat Rovira i Virgili, The University of Manchester and Imperial College London as Associate Profes-

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

ICB Institute for Chemical and Bioengineering

"A lot of knowledge on a relevant topic in the pharma industry very well explained and delivered."

Participant from 2019

sor. Dr. Guillén-Gosálbez' research activities focus on the application of systems approaches and mathematical tools, including machine learning algorithms, to problems encountered in the area of sustainable process engineering.

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 more than 15 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 70 publications and 4 patents.

Further Lecturers and Tutors

Dr. Fabian Feidl, PAT expert
Dr. Nicolas Cruz, *Modeling and automation expert*
Dr. Adam Szalkowski, IT expert
Dr. 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 (www.datahow.ch/news/events/course). It will be a three-day event from Monday, 7 September, morning to Wednesday, 9 September, late afternoon. 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 2'700 (CHF 1'700 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. An early-bird discount of 15% is offered until 31 May 2020. 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 after the course. It also includes free participation at the symposium on 10 September 2020. It does not include accommodation, travel costs or catering other than indicated.

Terms and Conditions

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 24 participants will be accepted in the course.
Cancellation policy: Cancellation of registration must be submitted in writing or via email to bigdata@chem.ethz.ch.
Cancellations made after 1st July 2020 will be subject to a 50% cancellation fee. Cancellations made after 1st August 2020 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, e.g. due to insufficient enrolment.

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.

"Gives a great overview and clarifies many concepts in the data analytics jungle."
Participant from 2019

Registration

Register online via:
https://de.surveymonkey.com/r/ETHbigdata2020

<mark>**Early bird discount until May 31st 2020: -15%.**</mark>

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 bigdata@chem.ethz.ch to check if places are still available.

Sponsors

ETH Zurich
Hönggerberg Campus
Room G274, HCI building
Vladimir-Prelog-Weg 1
CH-8093 Zürich

Dr Michael Sokolov, course organizer
bigdata@chem.ethz.ch

www.datahow.ch/news/events/course