



### Short course on

# Continuous Chromatography for Biotherapeutics

## 4<sup>th</sup> – 8<sup>th</sup> September 2022

### **Aim**

The aim of this course is to provide an introduction to continuous chromatography with hands-on practice with capture and polishing processes for biomolecules. These processes lead to improvements in productivity and manufacturing costs and may be even enabling in difficult purification challenges, such as antibody-drug conjugates or biosimilars. Attendees will acquire the basic tools to design, run and evaluate multicolumn processes and to quantify these improvements, serving as basis for an economic evaluation. As the least complex of all multi-column processes, the workshop is focused on twin column chromatography.

### **Scope**

- Introduction to continuous chromatography for biomolecules
- Theory of multi-column chromatography
- Design of multi-column chromatography processes
- Hands-on training on twin column equipment capture and polishing applications
- Process performance evaluation and scale-up

*This workshop does not cover 4-zone SMB, chiral and small molecule separations.*

### **Who should attend**

This course is aimed at industry and academic separation scientists and bioprocess development engineers who already have some familiarity with single column chromatography and who want to broaden their understanding of chromatographic processes and look at new and more efficient ways to separate and polish biomolecules.

*“The continuous chromatography course had an excellent balance of theoretical content and laboratory based exercises. It was great to explore the significant gains observed in productivity, buffer consumption and resin utilization over batch chromatography.”*

PhD. Theresa Ahern, Eli Lilly (IE)

## Format

The course takes the form of presentations and interactive workshops using laboratory-scale Contichrom CUBE twin column separation & purification systems. Supervisors and graduate assistants will support the participants during the interactive workshops and data analysis sessions.

## Course leaders



**Massimo Morbidelli** *Ph.D., Professor of Chemical Reaction and Separation Technologies in the Department of Chemistry, Politecnico di Milano.*

A pioneer in preparative continuous chromatography and in particular in the application of multicolumn technologies for protein purification in the pharma industry, 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. He is a co-founder of ChromaCon AG in Zurich.



**Thomas Müller-Späh**, *Ph.D., Director of RnD at ChromaCon AG in Zurich.*

After an assignment at Bayer Healthcare, Thomas completed his doctoral work on continuous chromatography of biomolecules in the group of Prof. Morbidelli, and co-founded ChromaCon AG to bring the technology to the market. He has been working on research projects with industrial partners, development of chromatography processes and equipment, and IP management. He has presented on numerous workshops and conferences on continuous chromatography and has co-authored over 20 publications and patents.

## Supervisors and tutors

Sebastian Vogg, Richard Weldon, Lars Aumann

## Venue

The course will be held at the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) at the new campus in Muttenz (Basel). The FHNW Muttenz Campus is well served by public transport (see <https://www.fhnw.ch/en/about-fhnw/locations/muttENZ>). International flight connections are available from Basel and Zurich International Airports.

**Note:** As the workshops will take place in a laboratory environment we ask that participants dress appropriately. Safety glasses and lab coats will be provided.

## Course program

### Sunday, September 4<sup>th</sup>

Lecture 1: General introduction

*Reception and dinner*

### Monday, September 5<sup>th</sup>

Lecture 2: Basics of continuous chromatography

Lab workshop 1: Batch capture

Lecture 3: Insight into continuous capture processes

Lab workshop 2: Continuous Capture

### Tuesday, September 6<sup>th</sup>

Lecture 4: Performance evaluation of continuous chromatography

Evaluation workshop 1 and 2: Batch and Continuous Capture

Lab workshop 3: Gradient Batch

Presentation of BT, Batch and CSMB results by groups

Lecture 5: Continuous polishing of biomolecules

*Evening program*

### Wednesday, September 7<sup>th</sup>

Evaluation Workshop 3: Gradient Batch

Lab workshop 4: MCSGP

Lecture 6: Integrated continuous chromatography

Lecture 7: Modelling and simulations

Simulation Workshop: Process simulation

Lecture 8: N-Rich process for impurity isolation

### Thursday, September 8<sup>th</sup>

Lecture 9: Continuous frontal and flow-through processing

Evaluation Workshop 4: MCSGP process

Presentation of MCSGP results by groups

Lecture 10: Scale-up of continuous chromatography

Lecture 11: Course wrap up

*This program might be subject to minor changes*

*“Great to learn all the potential and application of the different ways of using continuous chromatography and learn that this is not just a smart way of working in research, but that it can be implemented in large scale production.”*

PhD. Mercedes Ferreras, Novo Nordisk (DK)

### Course fees

The course fee is CHF 4'000 (CHF 2'500 for students). This includes lecture summaries in paper and electronic formats, materials used during the workshop, internet access (wifi), lunch and coffee breaks as well as two dinners. It does not include accommodation, travel costs or catering other than indicated above.

### 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 12 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 1<sup>st</sup> Aug 2022 will be subject to a 50% cancellation fee.

Cancellations made after 15<sup>th</sup> August 2022 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.

### Accommodation

Travel and accommodation are not included in the course fee. Hotel recommendations include:

**Hotel Baslertor\*\*\*** ([www.hotel-baslertor-muttENZ.ch](http://www.hotel-baslertor-muttENZ.ch))

**Hotel b\_motel\*\*\*** ([www.b-smarts.net/basel](http://www.b-smarts.net/basel))

### Disclaiming statements

FHNW 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.

FHNW and the course organisers are not responsible for private possessions lost or stolen at a course.

### Registration

Please use the following link for registration:

[www.fhnw.ch/ccb](http://www.fhnw.ch/ccb)

Registration is only complete after payment.

Registration is binding unless the minimum of participants cannot be reached.

Only participants with industry and academic affiliation can be accepted, no vendors.

**Registration deadline is July 31<sup>st</sup>, 2022.**

To register past the deadline, please write to the course officer at [info.lifesciences@fhnw.ch](mailto:info.lifesciences@fhnw.ch) to check if places are still available.

### Covid-19 precautions

The organizers will take the necessary measures to comply with Coronavirus safety requirements. This may include wearing of nose/mouth protection, use of disinfectant, safety distances and other measures

### Event sponsor



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