

1st International EUROMBR Training Course Innovative microbioreactor applications in bioprocess development

The participants will learn about the main aspects of microbioprocess engineering and microfabrication technology and how these subjects enable microbioreactor (MBR) systems that allow automated, highly parallelized operation, flexible process control, good scalability and the generation of reliable, reproducible and experimental data in real time over a long period of time.

The 1st International EUROMBR Training Course originates from the Marie Curie Initial Training Network EUROMBR anchored in the FP7 of the European Union. Within this network, application oriented professionals from nine countries have been working together for the education, development and application of the explorative MBR technology to sustain the future progress of bio-based processes.

The EUROMBR consortium would like to make its expertise accessible to all prospective scientists who want to gain a deeper understanding of MBR technology. The 5 day workshop including lecture programme and laboratory hands on in *microfabrication*, *enzyme immobilisation*, *analytics*, *biocatalysis* and *cultivation* are the specific application fields that are addressed in this program. The training course will have focus on basic examples of key problems. Based on example data sets, e.g. the following topics will be introduced:

- Micro-/nanofluidics
- Nano and micromaterials
- Microfabrication
- Sensors and inline-analytics
- Biocatalysis
- Enzyme immobilisation
- Whole cell cultivation
- Medical applications
- Modelling and design of microfluidic processes

For students the training course is equivalent to 3 ECTS-credits.

Monday, September 24, 2018

05:30 pm *Get together (all)*

All participants (students, PhD, Profs *et al.*) of the training course are asked to bring the following items on Monday to the mixer event at PVZ: A specialty drink or piece of dessert from their country, region or town. Each participant will be asked - at the start of the organization of the lab groups - to briefly introduce the specialty they have brought along. This will make a nice start to the lab discussions and the social programme.

Tuesday, September 25, 2018

05:00 pm Poster presentation and discussion (lab group 1)

Thursday, September 27, 2018

05:30 pm Poster presentation and discussion (lab group 2)

The participants will also get the opportunity to present and discuss their work in a 10 min presentation and in poster session intensively with the leading scientists.

Organisation

Zentrum für Pharmaverfahrenstechnik (PVZ)
Franz-Liszt-Straße 35a, 38106 Braunschweig
Phone: 0531/391-55311
Email: r.krull@tu-braunschweig.de

Arriving

Airport Hanover
with line S5 to Hannover main station (HBF) (20 min),
transfer at HBF Hannover to HBF Braunschweig (40 min).
via Berlin
HBF Berlin to HBF Braunschweig (90 min).



1st International

EUROMBR Training Course



Applications of microbioreactors in bioprocess development



Center of Pharmaceutical Engineering
Technische Universität Braunschweig
September 24 to 28, 2018



In cooperation with



1st International EUROMBR Training Course Innovative microbioreactor applications in bioprocess development

Monday, September 24, 2018

- 09:00 am **Registration**
Center of Pharmaceutical Engineering (PVZ)
Franz-Liszt-Str. 35a,
38106 Braunschweig
- 09:30 am **Welcome addresses and organization of the
Training Course**
Rainer Krull, *ibvt, TU Braunschweig, Germany,*
Torsten Mayr, *TU Graz, Austria*
- 09:45 am **Lecture 1:**
**Introduction to innovative microbioreactor
application in bioprocesses**
Polona Žnidaršič Plazl, *University of Ljubljana,
Slovenia*
- 10:45 am **Lecture 2:**
Introduction to micro-/nanofluidics
Andreas Dietzel, *IMT, TU Braunschweig, Germany*
- 12:00 am **Lunch**
- 01:30 pm **Lecture 3:**
Nano and micromaterials for microbioreactors
Jorge F. Fernández Sánchez,
University of Granada, Granada, Spain
- 02:30 pm **Coffee break**
- 03:00 pm **Lecture 4:**
Microfabrication
Monika Leester-Schädel, *IMT, TU Braunschweig,
Germany*
- 04:00 pm **Lecture 5:**
Sensors and inline-analytics
Torsten Mayr, *TU Graz, Austria,*
Adama Sesay, *University Oulu, Finland*
- 05:30 pm **Get together (all)**
Organization of lab groups 1 and 2
Mixer event (PVZ) and social programme

Tuesday, September 25, 2018

- Location Institute of Microtechnology (IMT), Salzdahlumer Str.
- 09:00 am **Introduction in Lab hands-on I/1**
Microfabrication
Andreas Dietzel, *IMT, TU Braunschweig, Germany*
- Sensors and Inline-Analytics**
Torsten Mayr, *TU Graz, Austria,*
Adama Sesay, *University Oulu, Finland*
- 10:00 am **Lab hands-on I/1**
Lab group 1: **Microfabrication**
Lab group 2: **Sensors and inline-analytics**
- 12:00 pm **Lunch**

- 01:30 pm **Lab hands-on I/2**
Lab group 1: **Sensors and inline-analytics**
Lab group 2: **Microfabrication**
- 03:30 pm **End of Lab hands-on I**
- 05:00 pm **Poster presentation (group 1) and discussion**
(participants and leading scientists)
- Location PVZ, Foyer

Wednesday, September 26, 2018

- Location PVZ, seminar room
- 09:00 am **Lecture 6:**
**Biocatalysis in flow: challenges and
opportunities**
Marco Marques, *University College London,
United Kingdom*
- 10:00 am **Lecture 7:**
**Immobilized enzymes as heterogeneous
biocatalysts: application in microreactors**
Juan Bolivar, *TU Graz, Austria*
- 11:00 am **Coffee break**
- 11:30 am **Lecture 8:**
**Microfluidic single-cell cultivation:
Introduction and application**
Alexander Grünberger, *Bielefeld University,
Germany*
- 12:30 pm **Lunch**
- 02:00 pm **Lecture 9:**
Whole cell cultivation in microbioreactors
Rainer Krull, *ibvt, TU Braunschweig, Germany*
- 03:00 pm **Introduction in Lab hands-on II**
Lab group 1 and 2
Enzyme immobilisation and biocatalysis
Juan Bolivar, *TU Graz, Austria,*
Marco Marques, *University College London,
United Kingdom*
- Whole cell cultivation**
Rainer Krull, *ibvt, TU Braunschweig, Germany*
Alexander Grünberger, *Bielefeld University,
Germany*
- 03:30 pm **Coffee break**
- 04:00 pm **Lab hands-on II/1**
Lab group 1: **Enzyme immobilisation and
biocatalysis**
Lab group 2: **Whole cell cultivation**
- 06:00 pm **End of Lab hands-on II/1**

Thursday, September 27, 2018

- Location PVZ
- 09:00 am **Lab hands-on II/2**
Lab group 1: **Whole cell cultivation**
Lab group 2: **Enzyme immobilisation and
biocatalysis**
- 11:00 am **End of Lab hands-on II/2 and coffee break**
- 11:30 am **Lecture 10:**
**Microfluidic systems for cell culture and
biological applications**
Janina Bahnmann, *TCl, LU Hanover, Germany*
- 12:30 pm **Lunch**
- 02:00 pm **Lecture 11:**
Microfluidics for cell therapies and beyond
Nicolas Szita, *University College London,
United Kingdom*
- 03:00 pm **Lecture 12:**
**Cell handling and analysis in microfluidic
devices for bio-medical applications**
Gerardo Perozziello, *University of Magna Graecia of
Cantazarro, Cantazarro, Italy*
- 04:00 pm **Coffee break**
- 04:30 pm **Lecture 13:**
**Microfluidic platforms for cell imaging and
cell sorting**
Iordania Constantinou, *IMT, TU Braunschweig,
Germany*
- 05:30 pm **Poster presentation (group 2) and discussion**
(participants and leading scientists)
- Location PVZ, Foyer

Friday, September 28, 2018

- PVZ, seminar room
- 09:00 pm **Lecture 14:**
**New electrokinetic analytical methods for
whole-cell biocatalyst studies**
Martina Viefhues, *Bielefeld University, Germany*
- 10:00 am **Lecture 15:**
**Modelling-based design of bioprocesses at the
micro scale**
Igor Plazl, *University of Ljubljana, Slovenia*
- 11:00 am **Lecture 16:**
**A short appetizer for CFD in Chemical and
Biochemical Engineering**
Ulrich Krühne, *DTU, Lungby, Denmark*
- 12:00 am **Concluding remarks**
Rainer Krull, *ibvt, TU Braunschweig, Germany,*
Torsten Mayr, *TU Graz, Austria*
- 12:15 pm **Snack**
- 01:00 pm **End of the Workshop**