

Registration Form
Biosystems Engineering
Braunwald, Switzerland
11 - 16 September, 2016

First Name

Last Name

Firm / Organization

Address

Phone, Fax

Email

I register for the course.

- Biologist Chemist
- Engineer (Bio)Informatitian
- Other, Specify

I bring my personal computer:
 YES NO

Send or fax this form to:

Prof. E. Heinzle
Biochemical Engineering
Saarland University
D-66123 Saarbrücken
Germany

Tel.: +49 - 681 - 302 2905

Fax: +49 - 681 - 302 4572

Email: e.heinzle@mx.uni-saarland.de

Total payment of Euro 2900.- for course and accommodations.

A fee of Euro 50.- is charged for the supply of a computer.

Payments should be made by bank transfer after billing.

Late cancellations are subject to a fee of Euro 500.-.

Bioreactor Modelling and Simulation

Mass and energy balances
Kinetics & stoichiometry
Batch, fed-batch & continuous operation
Heat and mass transfer
Scale-up & scale-down
Cell Modelling & Simulation

Metabolic network reconstruction

¹³C metabolic flux analysis
Elementary flux mode analysis
Flux balance analysis
Dynamic metabolic & regulatory networks
Prokaryotic & eukaryotic systems

Model-Based Design of Cells & Bioreactors

Prediction of optimum yields & pathways
Multi-omics driven strain engineering
Design principles of metabolic networks
Multi-scale models - Cells & bioreactor
Experimental design strategies
Bioprocess design

Industrial Case Studies

Mammalian cells for high-value therapeutics
Microbial recombinant protein production
Bio-based chemicals and materials
High-cell density production
Processing renewable raw materials
Whole cell biocatalysis

Exercises and Workshops

Computer aided exercises -
Berkeley Madonna & MATLAB software
Supporting computational tools
Workshops on selected topics

COURSE ANNOUNCEMENT

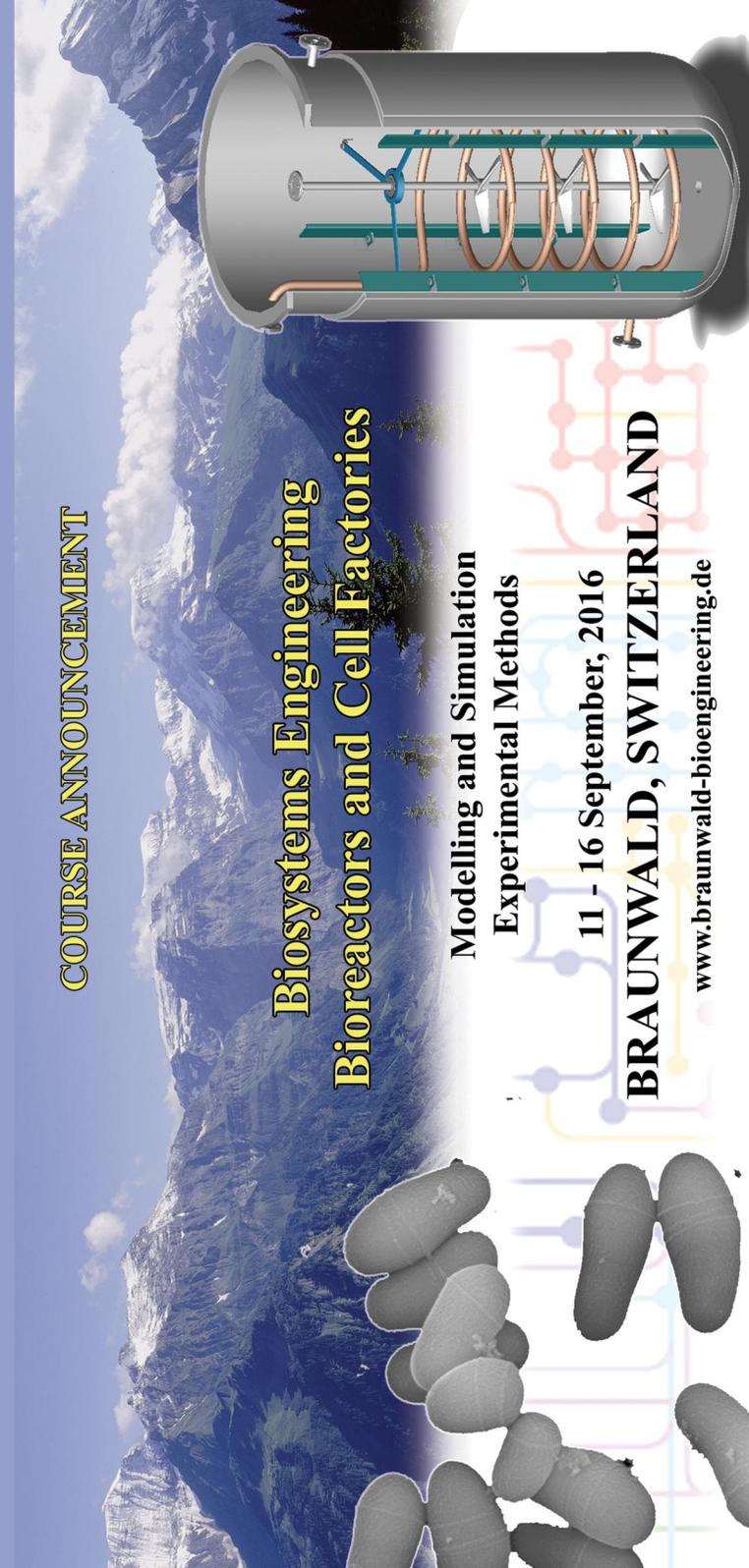
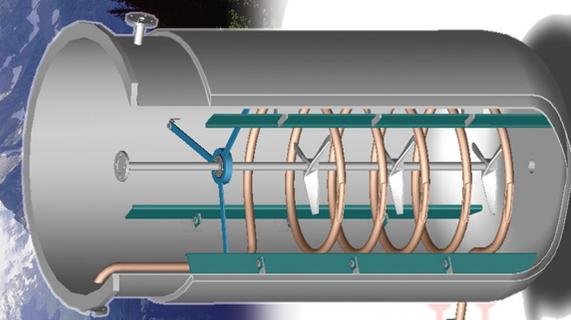
Biosystems Engineering
Bioreactors and Cell Factories

Modelling and Simulation
Experimental Methods

11 - 16 September, 2016

BRAUNWALD, SWITZERLAND

www.braunwald-bioengineering.de



The Instructors

Prof. Elmar Heinzle

Biochemical Engineering
Saarland University,
Saarbrücken, Germany



Prof. Matthias Reuss

Stuttgart Research Center
Systems Biology
University Stuttgart, Germany



Prof. Christoph Wittmann,

Institute of Systems Biotechnology,
Saarland University, Saarbrücken,
Germany



Guest Lecturer

to be announced

Teaching Methods

Small group size	Informal lectures
Book with software	PC simulation exercises
Instructor interaction	Research discussions

Time and Location

11 - 16 September, 2016 (18.00 Sunday - 14.00 Friday)
Hotel Bellevue, Braunwald, Switzerland
Morning and evening instructions
Afternoons free for mountain walking, tennis or leisure.

Reached by cable railway, the auto-free village of Braunwald is situated at 1300 m, far above the Linth Valley and close to high mountains (3600 m). In 1.5 hours it is connected by train to Zurich main station and airport. The Hotel Bellevue is an ideal, quiet location, and it is well equipped, comfortable, offers free WLAN and serves excellent meals.

Registration and Information

Apply to
Elmar Heinzle
Biochemical Engineering
Saarland University, Campus A1.5
D-66123 Saarbrücken, Germany
Tel.: +49 - 681 - 302 2905
Fax: +49 - 681 - 302 4572
Email: e.heinzle@mx.uni-saarland.de
Website: www.braunwald-bioengineering.de

All-Inclusive Course Fee

The all-inclusive fee of Euro 2900.- includes manual, book, software, single room with bath and all meals.

A fee of Euro 50.- is charged for the supply of a computer. Payments should be made by bank transfer after billing. Late cancellations are subject to a fee of Euro 500.-.

The course “**Biosystems Engineering**” is **uniquely combining modelling and simulation of bioreactors and biological systems**. With continuous updates reflecting the newest trends and developments in biotechnology research, it has successfully conveyed expert knowledge to participants from academia and industry since 1981. Enabled by the interdisciplinary expertise of the lecturers, it integrates the quantitative description and engineering of metabolic systems with their reactor environment and thereby provides the full picture for successful strain and bioprocess development at the frontier of current research.

A speciality of the course is the **hands-on use of simulation software and relevant exercises**. Using examples from our book "Biological Reaction Engineering" and the easy-to-use simulation program Berkeley Madonna, the participants gain solid understanding of physical systems in biotechnology and their models and they can directly interact by changing process parameters and interpreting the graphical output. This greatly enhances the learning of mathematical modelling. Further exercises on metabolic networks use different software packages integrated in MATLAB, which will also be available during the course.

The **intentionally kept small group size provides a great learning atmosphere and close personal interactions with the lecturers**. This gives rich opportunities to react to particular interests of the participants for special topics, workshops, and individual simulation problems. The teaching material outlines state-of-the-art methods as they are applied today in academic and industrial research and development.

The participants and instructors live together in one of the most excellent Swiss mountain hotels. The course is scheduled for the morning and evening hours. The afternoons are usually reserved for a range of other activities, the most important of which is mountain walking and climbing. Often assisted with lifts to the top, we are able to enjoy the alpine world at 2000 m, from where the neighbouring peaks look very majestic. The special atmosphere of the course greatly enhances the learning experience. More details are given on our website.