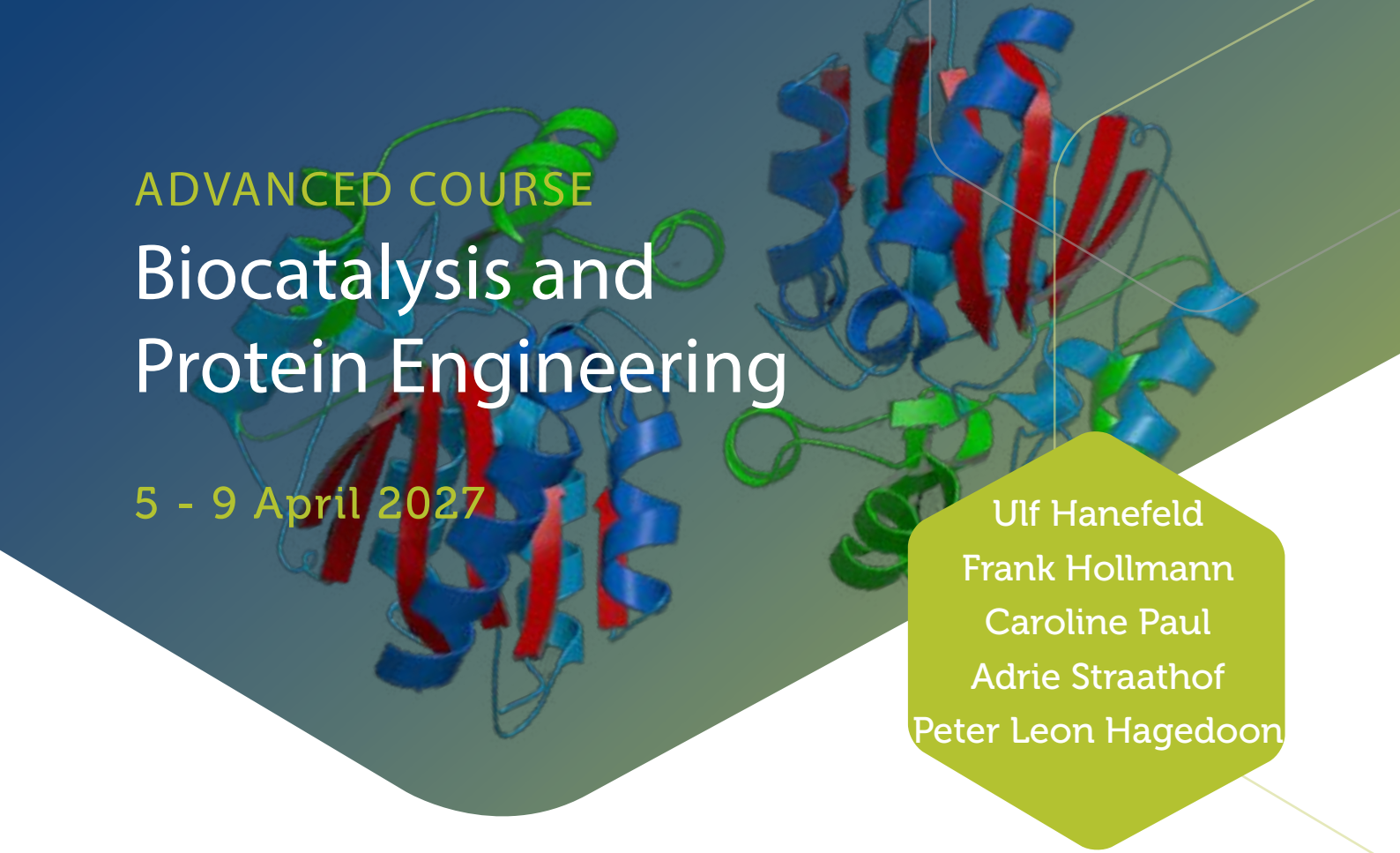


ADVANCED COURSE

Biocatalysis and Protein Engineering

5 - 9 April 2027

Ulf Hanefeld
Frank Hollmann
Caroline Paul
Adrie Straathof
Peter Leon Hagedoon

AIM OF THE COURSE

The aim of the course is to familiarize participants with the integrated, interdisciplinary approach required to utilize the catalytic potential of enzymes and whole cells for the production of useful compounds. Organic chemists, enzymologists, microbiologists and (bio)chemical engineers from the faculty staff of Delft University of Technology and other universities, together with invited international experts from industry, will offer a selection of theory and practice. In this way, the course will provide an intensive and in-depth treatment of the state of the art and the necessary link between fundamental knowledge and practical applications in industrial scale processes.

All teachers of this course are experts in their topic and have been selected for their outstanding teaching qualities. The course thus provides all participants with up to date knowledge taught by approachable lecturers. The participants are invited to ask questions during and after the lectures and will be engaged in the learning process. This very personal approach is underlined by the fact that the group is small with a maximum of 35 participants. At the end of the course the participants will be well educated on all aspects of biocatalysis, from selection of the right biocatalyst, its production and improvement to reaction engineering. Additionally the participants will have made acquaintances with all experts in the fields and among each other providing many opportunities for future contacts.

BioTechDelft
POSTGRADUATE EDUCATION

TU Delft

COURSE DESCRIPTION

This one-week course is intensive and has long days. To ensure active participation by those attending, a combination of theoretical (lectures), practical demonstrations and practical work (exercises, case study) is offered. Some online preparatory materials will be given to ensure all have the same basic knowledge.

LECTURES

Lectures are setup to be interactive but active participation of the participants is of course vital to the success of the lectures. During the lectures attention will be paid to the following questions:

- When is biocatalysis the preferred method?
- Which type of biocatalysis should be used?
- How to obtain / improve this biocatalyst?
- Which reaction types can be carried out?
- How to perform and monitor the conversion?
- How to optimize the reaction conditions?

CASE STUDY AND WORKSHOP

For a better understanding of the lectures, the theory is applied in exercises in a case study. The workshops on Enzyme visualization / bioinformatics will be offered in two different levels, so even advanced participants will definitely be challenged!
The course will be given in English.

WHO SHOULD ATTEND?

This Advanced Course is aimed at professionals (MSc, PhD or equivalent experience) in biochemical engineering, organic chemistry, fermentation technology, biochemistry or microbiology with a basic working knowledge of the other disciplines. The course is primarily aimed at those already employed in industry who wish to up-date their theoretical knowledge and practical insight in this field. In addition, this Advanced Course is an option in the two-year postgraduate programs of Delft University of Technology.



COURSE BOARD

Ulf Hanefeld
Biocatalysis
Delft University of Technology
Delft, the Netherlands

Frank Hollmann
Biocatalysis
Delft University of Technology
Delft, the Netherlands

Caroline Paul
Biocatalysis
Delft University of Technology
Delft, the Netherlands

Adrie Straathof
Bioprocess Integration
Delft University of Technology
Delft, the Netherlands

Dr. Peter Leon Hagedoorn
Delft University of Technology
Delft, the Netherlands

COURSE COORDINATION

Yvonne van Gameren
Jenifer Baptiste
BioTech Delft
Delft University of Technology
Delft, the Netherlands

LECTURERS

Alessandra Basso

Bernhard Hauer
University of Mainz
Mainz, Germany

Marco Fraaije
Molecular Enzymology
University of Groningen
Groningen, the Netherlands

René de Jong
dsm-firmenich
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Oliver Thum
Evonik Operations GmbH
Essen, Germany

John Woodley
Technical University of Denmark
Lyngby, Denmark

Morten van Schie
Centrient Pharamceuticals
Rotterdam, the Netherlands

Reuben Leveson-Gower
Biocatalysis
Delft University of Technology
Delft, the Netherlands

PROGRAM

MONDAY 5 APRIL 2027

08.45	Registration
09.00	Outlook of the course and introductions *Ulf Hanefeld*
09.30	Principles and applications of enantioselection *Caroline Paul*
10.45	Biocatalysis for API/Pharmaceuticals production *Morten van Schie*
11.30	Case study: Hydrolysis - esterification - transesterification - aminolysis - perhydrolysis introduction - organic media - introduction enantioselection *Ulf Hanefeld*
12.45	Group picture & Lunch work-break
13.45	Team presentations case study
15.00	Economics and implementation of biocatalytic processes *John Woodley*
18.00	Social drink and buffet

TUESDAY 6 APRIL 2027

09.00	Themes of the day
09.15	From natural environment to biocatalyst *Gerard Muyzer*
10.30	Industyial applications of immobilized enzymes *Alessandra Basso*
11.45	Reaction engineering: optimizing the medium for enzymatic conversions *Caroline Paul*
12.45	Lunch
13.45	Enzyme-catalysed synthesis of C-C bonds: hydroxynitrile lyases *Ulf Hanefeld*
14.45	Enzyme-catalysed synthesis of C-C bonds: aldolases *Ulf Hanefeld*
16.00	Plastic upcycling through enzymatic and microbial catalysis *Nick Wierckx*
17.00	End of day

WEDNESDAY 7 APRIL 2027

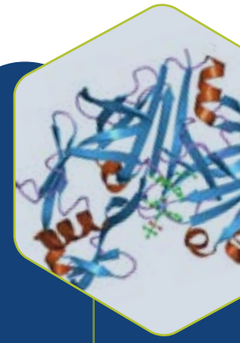
9.00	Themes of the day
9.15	Discovery and engineering of cofactor-dependent enzymes *Marco Fraaije*
11.30	Rational design and directed evolution of enzymes *Sandy Schmidt*
12:15	Lunch
13.15	Continuation: Rational design *Sandy Schmidt*
14.00	An industrial perspective from the world of flavors and fragrances *Sébastien Willot*
15.15	Computer practical: PyMOL *Peter Leon Hagedoorn*
18.00	End of day

THURSDAY 8 APRIL 2027

09.00	Themes of the day
09.15	From biotransformation towards industrial process - part 1 *Adrie Straathof*
11.30	Protein engineering to bring progress to life™ *René de Jong*
12.45	Lunch
13.45	Biocatalytic processes to oxyfunctionalised products *Martin Schürmann*
15.30	Biocatalysis - A tool for sustainable production of ester-based surfactants *Oliver Thum*
16.45	Plenary discussion
18.00	Course dinner

FRIDAY 9 APRIL 2027

09.00	Themes of the day
09.15	Computational Enzyme Engineering and Design: Part 1 *Reuben Leveson-Gower*
10.15	Computational Enzyme Engineering and Design: Part 2 *Reuben Leveson-Gower*
11.00	Reduction reactions *Frank Hollmann*
12.00	Lunch
13.00	Oxidation reactions *Frank Hollmann*
14.15	Biocatalysts for the synthesis of chiral amines *Bernhard Hauer*
15.15	Evaluation, Certification and Closure *Frank Hollmann*
16:00	End of the course



LOCATION

The course will be held at the
Delft University of Technology
Department of Biotechnology
Van der Maasweg 9
2629 HZ Delft, The Netherlands

COURSE REGISTRATION

Please register via the website to attend the course. Applicants will be handled in order of the date of receipt.

COURSE FEE

The course fee can be found on the website. The fee includes course materials, lunches, the buffet on Monday and the course dinner on Thursday. The fee does not cover other meals and lodging.

When the number of participants is too low to have a fruitful course, BioTech Delft will cancel the event no later than six weeks before the start of the course. The course fee will be reimbursed within three weeks after cancellation.
In case a speaker will not be able to present his/her lecture due to unforeseen circumstances, BioTech Delft will arrange an equivalent replacement.

Preparatory texts will be send a month before the start of the course. The complete digital course book will be supplied at the start of the course.

BioTech Delft organises biotechnology education at postgraduate level. BioTech Delft closely cooperates with the department of Biotechnology of Delft University of Technology. Since its foundation, in 1987, BioTech Delft has very successfully organised various types of postdoctoral education.

Currently BioTech Delft offers Advanced Courses given each year, covering the multidisciplinary spectrum of biotechnology. The courses have a long track-record dating back to 1988.

- *Microbial Physiology and Fermentation Technology (1988)*
- *Downstream Processing (1989)*
- *Biocatalysis and Protein Engineering (1999)*
- *Bioprocess Design* (2014)*
- *Modelling and Computation for Micro-organisms in Bioprocesses (2018)*
- *Multi-Omics approaches for Improvement of Industrial Microbes (2020)*
- *Cellular Agriculture: Precision fermentation and cultured meat (2024)*
- *EPS for resource recovery (2025)*
- *Biopharmaceutical Bioprocessing (2025)*
- *AI Fundamentals for Biotechnology (2026)*

** in partnership with Wageningen University & Research*

FURTHER INFORMATION

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Advanced Courses in Biotechnology

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