



# SCIENTIFIC UPDATE

*We've got chemistry*

## BIOCATALYSIS AS A TOOL FOR THE SYNTHETIC CHEMIST

27-28 JUNE 2019

**Cologne,  
Germany**

Hotel Pullman  
Cologne

A 2 day course  
presented by  
**Dr Andrew Carnell  
& Dr Will Watson**

"The course  
was for me the  
best starting point to dive  
into the field of Biocatalysis.  
I can recommend it to  
everyone who wants to start  
or to further develop in this  
field."

**MSD Animal Health  
Manufacturing**

# BIOCATALYSIS AS A TOOL FOR THE SYNTHETIC CHEMIST

Multiple  
attendees  
discounts  
**UP TO 15%**  
available

27-28 June 2019 Cologne, Germany, Hotel Pullman Cologne

## INTRODUCTION

**The aim of the course is to give organic chemists an understanding and an overview of the subject of biotransformations.**

Attendees will learn about the main classes of enzymes and the transformations these enzymes carry out.

Each transformation type will be illustrated with examples and case studies and the course will also include problem sessions where attendees will work on real examples applying biotransformations to organic synthesis.

Recent developments in the field will be covered as well as an overview of the sort of equipment and resources required for research and scaling up biocatalytic reactions. Several industrial examples of biocatalysis will be discussed. The Course will conclude with a comparison of biocatalysis and chemocatalysis.

## COURSE OUTLINE

### Introduction to Biocatalysis

- > Literature sources for biocatalysis (books and review articles)
- > Myths about biocatalysis
- > Enzyme / protein basics, basic microbiology
- > Sources of biocatalysts
- > Equipment requirements
- > Enzyme types

### Hydrolytic Enzymes (Lipases, esterases, amidases, proteases)

- > Mechanism of hydrolysis by enzymes
- > Kinetic resolution
- > Use of organic solvents
- > Dynamic kinetic resolution (DKR)
- > Deracemisation
- > Ester, amide, nitrile and epoxide hydrolysis concentration

### Oxidations

- > Alcohol oxidation
- > Amine oxidation, deracemisation of amines and amino acids
- > Bio-oxygenation, bio-hydroxylation
- > Demethylation
- > Epoxidation
- > Bayer-Villiger oxidation
- > Sulphoxidation

### Reduction

- > Ketone reduction, Prelog rules
- > Co-factors
- > Deracemisation of secondary alcohols
- > Enantioselective reduction / DKR
- > Keto-ester reduction
- > C=C reduction

### C-C and C-X bond formation

- > Aldol reactions
- > Transketolases
- > Cross benzoin reactions
- > Hydroxy-nitrile lyases
- > Michael reactions
- > Transamination
- > Fumarase and aspartase

### Scale Up of Biotransformations

- > Reactors
- > Scale up issues
- > Case studies

### New Developments including Directed Evolution

- > Polymerase Chain Reaction
- > Mutagenesis
- > Directed Evolution
- > Product isolation

### Pros and Cons of Biocatalysis

- > Summary
- > Q&A, discussion

## VENUE

### Hotel Pullman Cologne

Helenenstrasse 14  
50667 KOELN  
GERMANY

[www.pullmanhotels.com](http://www.pullmanhotels.com)

Stylish elegance within easy walking distance of Cologne Cathedral, the Rhine and the historic old town: You're sure to have time for a spot of sightseeing before or after your meetings.

The Pullman Cologne is an upscale business hotel well situated in the heart of Cologne. With numerous culture, nightlife, shopping and business options within the vicinity. Rooms are equipped for ultimate comfort the rooms in this elegant, design-focused hotel are modern, some featuring a rain shower. Guests seeking peace and quiet will find what they are looking for in the hotel's spa area.





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**Start** 9.00am - Thursday 27 June

**Finish** 3.30pm - Friday 28 June

**Course dinner** 7.30pm - Thursday 27 June

**Course Fee:** €1,799

Which includes comprehensive course manual, refreshments throughout the day, lunch and one course dinner.

**Course fee:** €1,799

## COURSE TUTORS

### Dr Andrew Carnell

Dr Andrew Carnell is a graduate from the University of Kent (1988) and obtained his Ph.D. from the University of Exeter (1991) for work on the use of Cycloalkanone Monooxygenase enzymes in Organic Synthesis. As a post-doctoral fellow at the University of Montreal, Canada, he worked with Prof Steve Hanessian on the total synthesis of the indole alkaloid reserpine before returning to Exeter as a Chiroscience Lecturer. From 1993, Andrew was a Research Chemist in the Chiral Chemistry Group at Associated Octel Ltd., before joining the staff at the University of Liverpool in January 1996, where he is now Reader in the Department of Chemistry.

His research interests are in the discovery, development and application of biotransformations in organic synthesis, directed evolution, high throughput screening and medicinal chemistry.



### Dr Will Watson

Technical Director,  
Scientific Update

Will Watson gained his PhD in Organic Chemistry from the University of Leeds in 1980. He joined the BP Research Centre at Sunbury-on-Thames and spent five and a half years working as a research chemist on a variety of topics including catalytic dewaxing, residue upgrading, synthesis of novel oxygenates for use as gasoline supplements, surfactants for use as gasoline detergent additives and non-linear optical compounds.

In 1986 he joined Lancaster Synthesis and during the next 7 years he was responsible for laboratory scale production and process research and development to support Lancaster's catalogue, semi-bulk and custom synthesis businesses. In 1993 he was appointed to the position of Technical Director, responsible for all Production (Laboratory and Pilot Plant scale), Process Research and Development, Engineering and Quality Control. He helped set up and run the Lancaster Laboratories near Chennai, India and had technical responsibility for the former PCR laboratories at Gainesville, Florida. He joined Scientific Update as Technical Director in May 2000. He is also involved in an advisory capacity in setting up conferences and in the running of the events. He is also active in the consultancy side of the business.



[will@scientificupdate.com](mailto:will@scientificupdate.com)

## REGISTRATION

You can either use our fast online booking system or mail or fax the attached registration form to:  
Scientific Update  
Maycroft Place, Stone Cross, Mayfield,  
East Sussex, TN20 6EW, UK  
Fax Number +44 1435 872734

### How to Pay

When you register online, you can have the option to pay via credit card (Mastercard or Visa). A receipted invoice will be automatically generated once paid and sent via email. Should your company wish to pay by cheque or bank transfer bank details will be supplied with an invoice.

### Bank Transfer or Cheque

Should your company wish to pay by cheque or bank transfer, on booking you can choose between paying in either €, \$ or £. All bank details will be supplied with an invoice.

### Group Discounts

Group discounts are available on two or more attendees - see registration form. This offer only applies if bookings are made simultaneously and from the same billing address.

### Confirmation of your registration

These will be sent via email.

### Late Applications

For late applications, please register online or fax the completed registration form, including credit card payment information.

### Cancellations/Refunds

Should you be unable to attend and cancel in writing no later than 1 month before the start of the course, Scientific Update will refund your registration less £300 (or equivalent in €/€) processing fee. Unfortunately refunds are not possible after that date. Substitutions can be made at any time.

## IN-HOUSE COURSE

For 8+ people contact us to discuss holding this event In-House -  
[sciup@scientificupdate.com](mailto:sciup@scientificupdate.com)



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## FAST ONLINE REGISTRATION

Look for the **BOOK NOW** button on the event of your choice  
[www.scientificupdate.com](http://www.scientificupdate.com)

27-28 June 2019 Cologne, Germany

No. of attendees  @ €1,799

**Special Offer!** Register 2 delegates and receive 5% on 2nd booking  
Register 3 delegates and receive 10% on 3rd booking  
Register 4 or more delegates and receive a 15% discount

### First attendee

Company   
Title (Dr/Prof/Mr/Mrs/Ms)   
First name   
Surname   
Job Title   
Address   
  
  
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### Second attendee **SAVE 5%**

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### Payment Methods

Payment will be made by:

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In Currency:

Euros  GBP\*  or Dollars\*

We accept the following credit cards:

Amex\* Mastercard Visa

To pay by credit card a secure link will be provided once you receive your booking confirmation email, this will then take you to a secure payment gateway.

\*payments via Amex can only be made in US dollars

#### \* Currency Payments

If you select to pay in GBP, or Dollars the amount charged will be based on the exchange rate at the time of preparing the invoice.

#### Discounts

Complete the details for either two or three delegates and your discount will automatically be applied. This offer only applies where all delegates are booked simultaneously and at the same billing address.

#### Cancellations

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#### Data Protection

Scientific Update Ltd is registered under the Data Protection Act 1998. We will store your information securely and only share your contact details with other attendees at this event. If you are happy for your details to be passed to any third parties please tick here:

For full terms of business and payment details please see our website

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