



# SCIENTIFIC UPDATE

*We've got chemistry*

## DESIGN OF EXPERIMENTS FOR CHEMISTS AND ENGINEERS (DOE)

23-24 MAY 2018

**Barcelona, Spain**  
Tryp Condal Mar Hotel

"Excellent course  
material and examples.  
A must for PR&D and  
Production chemists."  
**Carbogen AMCIS**

### Who is the course aimed at?

Organic Chemists/Medicinal  
Chemists in R&D  
Development and Production  
Chemists  
Chemical Engineers  
Managers



A 2 day course given by  
**Dr Paul Murray**

### PROFESSIONAL DEVELOPMENT TRAINING

Scientific Update provides training courses for industrial chemists and chemical engineers in chemical development and scale-up and many other specialist topics in organic and process chemistry. Our short intensive training courses enable scientists to learn about highly relevant topics, to broaden their knowledge and to keep abreast of new science, new technology and new techniques.

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# DESIGN OF EXPERIMENTS FOR CHEMISTS AND ENGINEERS (DOE)

A 2 day course given by Dr Paul Murray

23-24 May 2018 Barcelona, Spain, Tryp Condal Mar Hotel

Multiple attendees discounts  
UP TO 15% available

## INTRODUCTION

**Industrial Scientists can no longer afford to experiment in a trial-and-error manner, changing one factor at a time. A far more effective method is to apply a systematic approach to experimentation that considers all factors simultaneously.**

This approach is called Design of Experiments (DoE) and many scientists use it as an efficient way to solve serious problems afflicting their projects.

DoE provides information about the interaction of factors and the way the total system works, something not obtainable through traditional testing methods. DoE also shows how interconnected factors respond over a wide range of values, without requiring the testing of all possible values directly. DoE is a fundamental aspect of Quality by Design

The two day course is written and presented by a process chemist with extensive experience of applying DoE across a wide range of chemical reactions from reaction screening and new route development through to reaction optimisation and scale up.

The course will empower scientists to implement DoE in their work to more efficiently improve their processes.

## COURSE OUTLINE

### DAY ONE

#### Session 1

Introduction to the principals of Design of Experiments with a comparison with traditional methods. Introduction to DoE language and the DoE process. How to identify potentially important factors and ranges.

#### Session 2

Designs for 2 factors. Taylor's expansion and an introduction to the statistics. Designs for 3 and more factors.

#### Session 3

Workshop: Identifying factors, selecting ranges. Identifying main effects and interactions.

#### Session 4

Fractional Factorial designs. Different design types from screening designs to optimisation and robustness designs. How and when to use the different design types.

### DAY TWO

#### Session 1

Principal component analysis (PCA) for solvent selection.

#### Session 2

Case studies.

#### Session 3

Workshop: implementing DoE.

#### Session 4

Review of the course and questions.

## COURSE OBJECTIVES

### What does the course set out to achieve?

Design of Experiments (DoE) is a statistical tool which enables the efficient exploration of potential reaction parameters and their effect on a process. DoE is a fundamental aspect of Quality by Design.

The course will introduce the DoE Process and how to use it to develop and understand chemical reactions and processes.

## VENUE

**Tryp Condal Mar Hotel**, Cristobal de Moura, 138 , Barcelona, Spain  
<https://www.melia.com/es/hoteles/espana/barcelona/tryp-barcelona-condal-mar-hotel/index.html>

A 15-minute walk from the beach, this contemporary, circular hotel is 3.7km from Sagrada Familia basilica and 22km from Barcelona-El Prat Airport.

The modern rooms provide free Wi-Fi, flat-screen TVs and desks, plus minibars and 24-hour room service. Some upgraded rooms add

coffeemakers or in-room exercise equipment. The hotel offers buffet breakfast. Additional amenities include a rooftop pool and bar, a sleek Mediterranean restaurant and a lobby bar. There's also a gym. Paid parking and an airport shuttle (fee) are available.

A limited number of rooms have been reserved at the hotel for the special rate €180 per night for single occupancy. This price includes buffet breakfast and VAT excludes City Tax. A hotel booking form will be sent when you register – please use this form to make your reservation directly with the hotel.



# SCIENTIFIC UPDATE

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**Start** 9.00am - Wednesday 23 May

**Finish** 3.30pm - Thursday 24 May

**Course dinner** 6.30pm - Wednesday 23 May

**Course Fee:** €1,700

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

**Course Fee: €1,700**

## COURSE TUTOR

### Dr. Paul Murray

Paul Murray Catalysis Consulting Ltd

Paul is a consultant with expertise in the fields of Catalysis, Design of Experiments, Principal Component Analysis and Process Development. Paul has a proven track record of the timely delivery of innovative solutions to projects resulting in significant reductions in costs and resources to customers.

Paul worked as a Process Development Chemist at AstraZeneca and collaborated with academics at the University of



Bristol to develop ligand property maps to enable the use of DoE for the efficient, rational development of catalytic reactions. Paul has 16 publications and 9 patents to date.

**"A very informative and well-organised course."  
Sterling**

## What will attendees gain from the course?

- > Understand the DoE process.
- > Select process factors and suitable ranges.
- > Understand the different types of experimental design and when to use them.
- > Identify main effects, interactions and interpret DoE models in relation to chemical understanding.
- > Understand where DoE will solve a problem and when to consider complementary techniques like reaction progress kinetics to probe more challenging processes.

## CONSULTANCY SOLUTIONS

### OUR EXPERTISE

We are specialists in Industrial Organic Chemistry, solving problems and managing projects in Process Research and Development covering the following industries:

- > **Pharmaceuticals**
- > **Fine Chemicals**
- > **Agrochemicals**
- > **Flavour & Fragrance**
- > **Specialty Chemicals**

### OUR TEAM

You will be assigned one leading consultant but you will benefit from our team with over 100 years collective industrial experience.

### OUR APPROACH

We will sign a CDA and discuss your project by telecon or webinar to assess what benefits we can offer. This initial consultation (up to 4 hours) is free of charge. After which we will offer a detailed proposal with the service we can provide tailored to your individual requirements.

## 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.

# DESIGN OF EXPERIMENTS FOR CHEMISTS AND ENGINEERS (DOE)



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23-24 May 2018 Barcelona, Spain

No. of attendees  @ €1700

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Register 3 delegates and receive 10% on 3rd booking  
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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

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

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