



# SCIENTIFIC UPDATE

*We've got chemistry*

## CHEMICAL DEVELOPMENT & SCALE-UP IN THE FINE CHEMICAL & PHARMACEUTICAL INDUSTRIES

Principles and Practice

28 FEBRUARY - 2 MARCH 2018

### Clearwater, USA

Sheraton Sand  
Key Resort

"I really enjoyed the course, the organisation was excellent. The afforded subjects were very interesting and the problem sessions/ examples made them easy to understand."

Farmhispania

#### Who is the course aimed at?

Organic Chemists/Medicinal Chemists  
Development and Production  
Chemists  
Chemical Engineers  
Students and Young Chemists



A 3 day course given by  
**Dr Will Watson**

### 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.

[www.scientificupdate.com](http://www.scientificupdate.com) | [info@scientificupdate.com](mailto:info@scientificupdate.com)

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# CHEMICAL DEVELOPMENT & SCALE-UP IN THE FINE CHEMICAL & PHARMACEUTICAL INDUSTRIES

A 3 day course given by Dr Will Watson

28 Feb - 2 Mar 2018 Clearwater, USA, Sheraton Sand Key Resort

Multiple attendees discounts  
UP TO 15% available

## INTRODUCTION

Chemical process development is generally not taught as part of degree courses in higher education; the conversion of a synthetic route used for making milligram or gram quantities of a chemical into a process for manufacturing multi-kilogram and tonne quantities is typically learnt "on the job" by chemists in industry. For many years, little chemical development work was published in the literature, until the establishment of the Organic Process R & D journal by Dr Trevor Laird (founder of Scientific Update). Even now, "tricks of the trade" are handed down within individual company organisations, and it can be difficult to gain an awareness of what is involved in chemical development, and of the skills and techniques required to efficiently scale-up chemical processes.

This three-day course, written and presented by highly experienced process chemists from the pharmaceutical and fine chemical industries, provides a comprehensive overview of this fascinating and important element of the chemical industry. A logical investigative approach to all aspects of chemical development is described, with an abundance of case studies from literature, conferences and private communications. The multi-disciplinary nature of chemical development is emphasised, from the initial interaction with laboratory research scientists to the vital partnership with chemical engineers in the pilot plant and in the production environment. The lectures are interspersed with interactive problem sessions, enabling participants to share in the problem solving and troubleshooting typically experienced during chemical development.

## COURSE OUTLINE

### Introduction

- > The purpose of chemical development

### Synthetic Route Discovery

- > Route design
- > Selecting the best route for scale-up
- > Choice of raw materials, reagents etc

### Costing of Chemical Processes

- > Raw materials
- > Overheads
- > Context

### The Investigative Approach to Chemical Development

- > Optimising Chemical Reactions
- > Making processes robust
- > Minimising scale-up difficulties

### Solvent Effects

- > Often overlooked
- > Key to making a modest process a great process

### Statistical Methods of Optimisation

- > Vital, but under-utilised
- > Design of Experiments
- > Simplex
- > Factorial design

### Analytical Issues

- > In Process Control
- > Quality Control and Specification Setting
- > Regulatory Guidelines
- > GMP, Validation
- > Use of analysis to aid process optimisation

### Work Up

- > Product isolation

### Planning for Scale-Up

- > Key points to consider

### Appreciation of Chemical Engineering Principles

- > Mass Transfer
- > Mixing
- > Heat Transfer
- > Kinetics

### Crystallisation and Polymorphism

- > Particle size control
- > Polymorph control
- > Methods of analysis
- > Crystallisation of chiral compounds

### New and Emerging Technologies in Process R&D

- > Microwave chemistry
- > Continuous flow chemistry
- > Process intensification

### Thermal Hazard Testing and Runaway Reactions

- > Essential process safety considerations
- > Equipment and screening approaches

### Effluent Minimisation and Control

- > Environmental considerations
- > Cost considerations
- > Green chemistry

## VENUE

**Sheraton Sand Key Resort**  
**1160 Gulf Boulevard**  
**Clearwater Beach**  
**Florida 33767, USA**  
[sheratonsandkey.com](http://sheratonsandkey.com)

The Sheraton Sand Key Resort is situated by powder white sandy beaches on the Gulf coast. All guest rooms have high-speed internet access, and wireless connectivity is

available throughout all public areas of the hotel and business centre.

A fitness centre is located on the top floor of the resort, and an all-weather tennis complex is open to guests at no extra charge.

A limited number of rooms have been reserved at a special rate of \$205 + taxes. Details on how to book this special rate will be sent to you when you register.



# SCIENTIFIC UPDATE

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**Start** 9.00am - Wednesday 18 April

**Finish** 3.00pm - Friday 20 April

**Course dinner** 6.30pm - Wednesday 18 April

**Course Fee:** \$2,475

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

**Course Fee:** \$2,475

## COURSE TUTOR

### 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)

"I thoroughly enjoyed the 3-day programme. The material was very relevant to the objectives of the course and I was pleasantly surprised that it included references as recent as last month. Will was an excellent communicator and made the course enjoyable."

**Dow Agrosciences  
LLC**

### At the end of the course, participants will have gained:

- > A logical investigative approach to chemical development and optimisation
- > An insight into the factors involved in scale-up
- > An appreciation of chemical engineering concepts, particularly mixing, heat transfer and process control
- > A preliminary knowledge of statistical methods of optimisation
- > Improved ability to decide which parts of the chemical process to examine in detail
- > Ideas for efficient resource allocation
- > Improved troubleshooting and problem solving ability

## 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.



28 Feb - 2 Mar 2018 Clearwater, USA

No. of attendees  @ \$2,475

**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**

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

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

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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.

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

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