



# SCIENTIFIC UPDATE

*We've got chemistry*



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

Principles and Practice

11-13 FEBRUARY 2019

**Mumbai,  
India**  
Hotel Sea  
Princess

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

"The course is well done! There are a lot of useful references from literature and the problem sessions help to develop troubleshooting and new ways of thinking."

**INDENA SpA**

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

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## 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.

## IN-HOUSE COURSE

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

## 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

### The Sea Princess Hotel

969 Juhu Tara Road, Juhu Beach, Santacruz (W), Mumbai 400 049, India

Tel: +91 22 26611111

Fax: +91 22 26603973

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

Located along the Juhu sea coast, Sea Princess Hotel is a 10-minute drive from Shoppers Stop. Mumbai's domestic and international airports

are a 30-minute drive away and hotel also provides free airport transfers from both Chhatrapati Shivaji Domestic and International Airports.





# SCIENTIFIC UPDATE

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**Start** 9.00am - Monday 11 February  
**Finish** 3.30pm - Wednesday 13 March

**Course Fee:** \$330

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

**Course fee:** \$330

## 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)

## 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.

### 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.

### 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

## 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 telecom 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.



11-13 February 2019 Mumbai, India

No. of attendees  @ \$330

### First attendee

Company   
Title (Dr/Prof/Mr/Mrs/Ms)   
First name   
Surname   
Job Title   
Address   
  
  
Post Code / Zip   
Country   
Tel   
Fax   
Email   
Mobile   
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What's new in Process Chemistry?

### Second attendee

Title (Dr/Prof/Mr/Mrs/Ms)   
First name   
Surname   
Job Title   
Tel   
Fax   
Email   
Special Diet   
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What's new in Process Chemistry?

### Third attendee

Title (Dr/Prof/Mr/Mrs/Ms)   
First name   
Surname   
Job Title   
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We accept the following credit cards:



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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 Euros the amount charged will be based on the exchange rate at the time of preparing the invoice.

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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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