



# SCIENTIFIC UPDATE

*We've got chemistry*



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

Principles and Practice

4-6 MARCH 2019

**Nashville,  
USA**

Hyatt Place  
Downtown

A 3 day course  
presented by  
**Dr Andrew D. Jones  
& 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

## Principles and Practice

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

**4-6 March 2019** Nashville, USA, Hyatt Place Downtown

## 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

### 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



# SCIENTIFIC UPDATE

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**Start** 9.00am - Monday 4 March

**Finish** 3.30pm - Wednesday 6 March

**Course dinner** 6.30pm - Monday 4 March

**Course Fee:** \$2,499

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

**Course fee:** \$2,499

## COURSE TUTORS

### Dr Andrew D. Jones

Principal at Pharma Consulting Associates

Andy studied Natural Science at King's College London, followed by a PhD in organic chemistry at The University of Leeds working for Professor Colin Fishwick. Andy was an SERC/NATO post-doctoral fellow with Professor Barry M. Trost at Stanford University from 1990-92.

After returning to the UK, Andy worked for ICI / Zeneca Pharmaceuticals in the process development department, initially as a senior chemist, followed by two years managing pilot plant operations before heading a chemistry team as Group Leader.

Andy moved to the US in 1999 and has held positions of increasing seniority at AMRI, Schering-Plough, Vertex and Concert Pharmaceuticals - where he was most recently Vice President of Pharmaceutical Development. During his career, Andy has contributed to the development of several approved drugs including boceprevir, telaprevir and ivacaftor.

In 2017, Andy started Pharma Consulting Associates to provide CMC, regulatory, quality systems and project management consulting services to the pharmaceutical and biotech industries.



### 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.

## VENUE

### Hyatt Place Nashville Downtown

301 3rd Avenue South, Nashville, Tennessee, USA, 37201

[nashvilledowntown.place.hyatt.com](http://nashvilledowntown.place.hyatt.com)

Located in a thriving, trendy neighborhood, we offer the Nashville vibe at the Hyatt value. We're one block from the Music City Center Convention Center, within walking distance to Nashville's famous Honky Tonk Row and both Nissan Stadium and Bridgestone Arena are less than a mile away.

Now offer valet parking and high-floor suites with awesome city views and the Hyatt Plug Panel media center perfect for tech-centric travel.





# CHEMICAL DEVELOPMENT & SCALE-UP



## FAST ONLINE REGISTRATION

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

4-6 March 2019 Nashville, USA

No. of attendees  @ \$2,499

### 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	<input type="text"/>
Title (Dr/Prof/Mr/Mrs/Ms)	<input type="text"/>
First name	<input type="text"/>
Surname	<input type="text"/>
Job Title	<input type="text"/>
Address	<input type="text"/>
	<input type="text"/>
	<input type="text"/>
Post Code / Zip	<input type="text"/>
Country	<input type="text"/>
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Email	<input type="text"/>
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Special Diet	<input type="text"/>
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### Second attendee **SAVE 5%**

Title (Dr/Prof/Mr/Mrs/Ms)	<input type="text"/>
First name	<input type="text"/>
Surname	<input type="text"/>
Job Title	<input type="text"/>
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Special Diet	<input type="text"/>
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### Third attendee **SAVE 10%**

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First name	<input type="text"/>
Surname	<input type="text"/>
Job Title	<input type="text"/>
Tel	<input type="text"/>
Fax	<input type="text"/>
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### Invoice Address (if different to delegate address)

Address	<input type="text"/>
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	<input type="text"/>
Post Code / Zip	<input type="text"/>
Country	<input type="text"/>
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☐ Please invoice my company

Purchase Order:

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### Payment Methods

Payment will be made by:

☐ Cheque ☐ Bank Transfer ☐ Credit Card

In Currency:

☐ Dollars ☐ GBP\* ☐ or Euros\*

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 Euros 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

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 fee less £300 (or equivalent in €/£) processing fee. Unfortunately refunds are not possible within 1 month of the course date. Substitutions can be made at any time.

#### 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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