



# SCIENTIFIC UPDATE

*We've got chemistry*

## SAFETY AND SELECTIVITY IN THE SCALE-UP OF CHEMICAL REACTIONS

9-10 OCTOBER 2018

### San Francisco, USA

AMA Executive  
Conference Center

"I really like the problem solving as it gives everybody an opportunity to exchange ideas and brainstorming."

Gilead, Alberta ULC



A 2 day course given  
by **Dr Will Watson**,  
Scientific Update

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# SAFETY AND SELECTIVITY IN THE SCALE-UP OF CHEMICAL REACTIONS

A 2 day course given by Dr Will Watson, Scientific Update

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

**9-10 October 2018** San Francisco, USA, AMA Executive Conference Center

## INTRODUCTION

The aim of the course is to give lab chemists an understanding of the issues that need to be considered during the early stages of scale up to large laboratory scale equipment (10-20 litre vessels) / kilo lab.

The course will concentrate on chemical safety and selectivity issues and include information on what safety testing equipment is available and the uses and limitations of this equipment.

Attendees will learn how to identify potential problems whether they be thermal hazards or selectivity issues. Methods used by other companies for handling hazardous reagents and reactions will be described as well as alternative chemistry to circumvent these reactions and/or reagents.

## WHO SHOULD ATTEND?

Any laboratory chemist involved in the scale-up to large scale equipment/kilo lab or beyond.

## 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 safety literature
- > Functional groups which can cause problems on scale up

### Improving safety and selectivity in chemical reactions

- > Inherent safety, choosing the right synthetic route
- > Reaction criticality classes (Stoessel diagrams)
- > Solvent selection
- > Choosing the right reagent
- > Catalysis - the plusses and minuses
- > Choosing the right reaction conditions, the effect of concentration

### Thermal Hazard Testing and Runaway Reactions

- > Introduction and overview of safety issues in the chemical industry
- > Heat loss considerations
- > Desk screening - unstable groups, Oxygen balance equation etc
- > Principles of hazard testing - equipment and uses
- > Effect of changes to reaction variables

### Solvent Selection and Solvent Effects

- > Reasons for choosing a solvent
- > Solvent guides
- > The effect of solvents on chemical reactions
- > Useful solvent parameters
- > Phase transfer catalysis
- > Water as a solvent
- > Alternative solvents - supercritical fluids, ionic liquids, fluorinated solvents

### Oxidation and reduction

- > Choice of reagent(s)
- > Stoichiometric versus catalytic
- > Reagent stability
- > Safety issues

### Hazardous Reactions and Reagents

- > Azides
- > Making triazoles and tetrazoles
- > Diazo compounds, including diazomethane
- > Petasis methylation
- > Grignard Reagents and Organolithiums
- > Use of cyanide

### Work Up

- > Quenching reactions / reagents
- > Minimising work up - Telescoping
- > Catalyst removal
- > Product isolation

### Scaling up chemical reactions

- > What can go wrong - it's not what you do but the way that you do it
- > Heat transfer areas
- > Importance of dose control and in process analysis
- > Reactions with initiation periods
- > Simple do's and don'ts
- > Flammability issues

### Case studies

- > Grignard reaction
- > Azide chemistry
- > Oxidation and reduction
- > Vilsmeier reaction



# SCIENTIFIC UPDATE

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**Start** 8.45am - Tuesday 9 October

**Finish** 4.30pm - Wednesday 10 October

**Course dinner** 7.30pm - Tuesday 9 October

**Course Fee:** \$1,880

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

**Course Fee:** \$1,880

## 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)

## VENUE

**AMA Executive Conference Center**  
55 4th St

San Francisco  
CA 94103, USA

[www.amaconferencecenters.org/san-francisco.htm](http://www.amaconferencecenters.org/san-francisco.htm)

Located in the San Francisco Marriott Marquis Hotel, AMA's San Francisco

Executive Conference Center is just minutes from the Cable Cars, Chinatown, shopping, museums and only 15 miles from the San Francisco International Airport.

For accommodation, a list of nearby hotels will be sent to you once you register for the course.

## CONSULTANCY SOLUTIONS

### OUR EXPERTISE

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

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## REGISTRATION

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Scientific Update  
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### How to Pay

When you register online, you can have the option to pay via credit card (Amex, Mastercard or Visa). For email payments please include course title, card number, expiry date and security code. 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.

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

9-10 October 2018 San Francisco, USA

No. of attendees  @ \$1880

### 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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#### \* 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

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

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