



# SCIENTIFIC UPDATE

*We've got chemistry*

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

13-14 JUNE 2019

**Toronto,  
Canada**  
Sheraton Centre  
Toronto

A 2 day course  
presented by  
**Dr Will Watson**

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

Gilead, Alberta ULC

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

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

13-14 June 2019 Toronto, Canada, Sheraton Centre Toronto

## 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)
- > Choosing the right reagent
- > Catalysis - the plusses and minuses
- > Choosing the right reaction conditions

### 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

### 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

### Oxidation and reduction

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

### Azide and Diazo Chemistry

- > Industrial scale approaches to tetrazole and triazole preparation
- > Recommendations for safe working with azides
- > Monitoring hydrazoic acid
- > Azo transfer reagents
- > Diazomethane chemistry at scale

### 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't's
- > Flammability issues

### C-C Bond Forming Reactions

- > Making and using Grignard reagents
- > Suzuki cross coupling
- > Cyanation

### Curtius and related rearrangements

- > Review of industrial approaches to scaling up these reaction



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**Start** 9.00am - Thursday 13 June

**Finish** 3.30pm - Friday 14 June

**Course dinner** 6.30pm - Thursday 13 June

**Course Fee:** \$1,899

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

**Course fee:** \$1,899

## 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 (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.

## VENUE

### Sheraton Centre Toronto

123 Queen St W  
Toronto  
ON M5H 2M9  
Canada

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

Superbly located in the heart of downtown Toronto and close to the city's top attractions, Sheraton Centre Toronto Hotel is the perfect destination for both work and play. Settle into our recently refreshed guest rooms and suites and experience 4-star amenities like an on-site spa, several delicious restaurants, a full fitness center and a state-of-the-art indoor-outdoor pool. The best of downtown Toronto

is at your fingertips here - our hotel is a conveniently connected to both the financial and entertainment districts by way of the PATH, a 16 mile underground network of shops and services. Regardless of what brings you here, we look forward to exceeding your expectations at Sheraton Centre Toronto Hotel.



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

13-14 June 2019 Toronto, Canada

No. of attendees  @ \$1,899

### 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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First name   
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### Payment Methods

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In Currency:

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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.

#### 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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#### Data Protection

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