



SCIENTIFIC UPDATE

We've got chemistry

SECRETS OF BATCH PROCESS SCALE-UP

Ensuring Effective Translation
of Laboratory Processes to
Pilot Plant Scale

2-4 APRIL 2019

"Very well
presented, gave
me a glimpse into the
complexity of chemical
engineering and how
much is possible when
transferring a process
to the plant."

Roche

**Vienna,
Austria**

Mercure Wien
City

A 3 day course
presented by
Francis X. McConville

SECRETS OF BATCH PROCESS SCALE-UP

Ensuring Effective Translation of Laboratory Processes to Pilot Plant Scale

2-4 April 2019 Vienna, Austria, Mercure Wien City

Multiple attendees discounts
UP TO 15% available

INTRODUCTION

Operating a commercially viable chemical process requires a good chemical synthesis to start with, but is also subject to the interplay of a myriad of important physical phenomena – heat transfer, mass transfer, fluid flow, etc. which are traditionally the realm of the chemical engineer. An understanding of these scale-up phenomena is crucial for the laboratory development of processes that will scale successfully.

This course presents an overview of these issues and examines their impact on process operation in the pilot plant and beyond, including scale-up considerations for route selection, raw material charging, reaction steps, workup, crystallization, product isolation, drying, etc. Common bench techniques for each of these steps are contrasted to the safety and operability criteria for successful pilot plant operation. Numerous examples and case histories are presented, along with tips and techniques for operators and experimenters. Heavy emphasis is placed on process safety.

Who should attend?

This course has been designed for synthetic chemists, process development chemists and process engineers in the pharmaceutical and fine chemical industries with limited pilot plant experience, who wish to learn more about the potential pitfalls of process scale-up and ways to avoid them.

Complimentary Literature

As part of the registration fee of this course, each participant will receive a copy of The Pilot Plant Real Book – A Unique Handbook for the Chemical Process Industry, authored by Mr. McConville. In addition, a course binder containing the full content of the course materials will be provided.

COURSE OUTLINE

Process Design for Scale-Up

- > Process development strategies
- > Importance of engineering in PD

Scale-Up – An Overview

- > Role of the Pilot Plant
- > Overview of scale-up issues
- > Technology transfer issues

Batch Reactors

- > Typical plant operations and equipment
- > Characteristics of batch operations

Raw Materials

- > Raw material and route selection
- > Large-scale charging methods and issues

Temperature Control

- > Large scale temperature control
- > Heat transfer in batch reactors
- > Controlling exothermic reactions

Following Reaction Progress

- > Reaction endpoint determination
- > Sampling methods / issues
- > On-line analytical techniques

Agitation and Mixing

- > Large scale mixing equipment
- > Mixing limited reactions
- > Mixing scale-up / scale-down

Quench and Work-Up

- > Liquid-liquid extractions
- > Phase continuity issues and emulsions

Distillation and Stripping

- > Differential distillation
- > Azeotropes and solvent exchange

Crystallization and Precipitation

- > Basic principles / yield estimation
- > Controlling supersaturation
- > Scale-up issues

Product Isolation and Drying

- > Large-scale solid-liquid separations
- > Filtration and drying equipment
- > Filtration and drying modeling

Process Hazards and Safety Assessment

- > Common hazards in large-scale processing
- > Process hazard assessments and evaluations

VENUE

Mercure Wien City

Hollandstrasse 3, 1020 Wien, Vienna 1020, Austria

Tel: (+43)1/213130

The Mercure Wien City is located in a quiet area only a short walk away from Vienna's bustling center, home to sights such as St. Stephen's Cathedral, Hofburg Palace or Prater park. The Danube Canal, found on the hotel's doorstep, is a gateway to rest and relaxation, be it walking, cycling or simply taking in the sun.

Near to the convention center, UNO City and the Austria Center. Rooms were renovated in 2016, and the hotel's own undercover car park is ideal for ensuring a successful stay and arrival.

We have organised a special accommodation rate at the Mercure of €125.00, per night. Details on how to book will be given on registration confirmation.



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Start 9.00am - Tuesday 2 April
Finish 3.30pm - Thursday 4 April
Course dinner 7.00pm - Tuesday 2 April

Course Fee: €2,099

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

Course fee: €2,099

COURSE TUTOR

Francis X. McConville

Francis X. McConville holds a B.Sc. degree in Chemistry and M.Sc. degrees in both Chemical Engineering and Biotechnology from Worcester Polytechnic Institute in Massachusetts. He has some 35 years of experience in the chemical and related industries, including positions at the Worcester Foundation for Experimental Biology and New England Renewable Fuels, where he was involved in such varied projects as oil recovery and biomass conversion.

He also spent 14 years at Sepracor, Inc. (now Sunovion) in the U.S. as a pharmaceutical process development engineer. His duties there included the design and operation of the company's kilo-labs, as well as the scale-up and transfer of many proprietary API processes to pilot and manufacturing sites in Taiwan, Japan, England, Scotland, and Canada. He was closely involved in the development and optimization of processes based on a variety of



technologies including selective biocatalysis, fermentation, ultrafiltration, and asymmetric crystallization.

For the past 16 years, Mr. McConville has worked at Impact Technology Development, Inc. in Devens, Massachusetts as a consultant, technology specialist and senior team leader. At Impact, Mr. McConville has been involved in such diverse projects as biomass conversion, emulsion polymerization, medical adhesives development, novel molten metal technology, and pharmaceutical crystallization optimization.

Mr. McConville is perhaps best known as the author of the popular manual for process development personnel entitled "The Pilot Plant Real Book – A Unique Handbook for the Chemical Process Industry". This highly practical handbook has garnered praise from readers in the fine chemical and pharmaceutical industries worldwide. Interested readers can learn more about the book at



www.pprbook.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.

IN-HOUSE COURSE

For 13+ people contact us to discuss holding this event In-House - sciup@scientificupdate.com

COURSE AIMS AND OBJECTIVES

To teach the practical aspects of designing a scaleable fine-chemical batch process and successfully implementing it at the kilo-lab and pilot plant scale, through an examination of the effects of large-scale operating methods and equipment limitations on process safety, operability, yield, selectivity and product quality.

Upon completion of the course, participants will be better equipped to:

- > Assess process safety and scaleability
- > Identify process operations that may be problematic on scale-up
- > Design processes that will minimize or avoid scale-up issues
- > Select operating methods and equipment for effective scale-up
- > Calculate heat removal rates and safe rates of addition of reagents
- > Determine mixing requirements for scale-up
- > Design crystallizations which can be successfully operated at scale
- > Predict the filterability of solid products upon scale-up
- > Minimize the effects of scale-up on yield, selectivity and product purity

SECRETS OF BATCH PROCESS SCALE-UP



FAST ONLINE REGISTRATION

Look for the **BOOK NOW** button
on the event of your choice
www.scientificupdate.com

2-4 April 2019 Vienna, Austria

No. of attendees @ €2,099

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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We accept the following credit cards:



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Mastercard



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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 Dollars 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

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

Please complete this form and fax to +44 (0)1435 872734

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