Faculty of Engineering and Physical Sciences

UNIVERSITY OF LEEDS

Fluid Bed Processing and Formulation

Monday 11 – Wednesday 13 May 2020

IMAGE COURTESY OF UNIVERSITY OF LEEDS

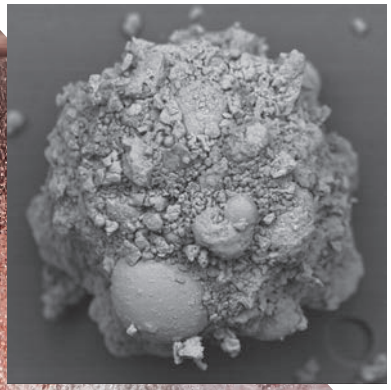

IMAGE COURTESY OF NEUHAUS NEOTEC

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COURSE EXPERTLY PRESENTED BY 7 ACADEMIC AND 13 INDUSTRIAL SPEAKERS WITH OVER 300 YEARS CUMULATIVE EXPERIENCE!

Supported by:

iFormulate

Fluid Bed Processing and Formulation

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About the course

Fluidised beds are widely used in industry due to their characteristic fluid like properties of good mixing and heat transfer. Applications of fluid beds range from combustion in power stations, catalytic reactors to the engineering of particles via methods such as low density agglomeration and encapsulation.

This course focuses on the use of fluid beds in the particle engineering area and covers:

- the basic principles behind fluidisation
- the importance of particle properties
- the impact of bed design on the structure and optimal operation of fluid beds, both batch and continuous

The course is grounded in practical experience gained across numerous industrial sectors by a range of speakers from academia, equipment manufacturers and end users. The scientific principles of fluid bed operation will be reinforced by a number of practical demonstrations which show the theory in practice.

Intended audience

- R&D scientists in industries such as pharmaceuticals, detergents, foods, agrochemicals or specialty chemicals and need a broad overview of the subject of fluid bed processing
- Scientists and chemical engineers who would value a deeper understanding of how science can be applied to real fluid bed processing problems
- Process technologists, plant managers, involved in R&D or process technicians who need a thorough practical grounding in the subject of fluid bed processing and how it can influence the properties of the final product
- University researchers who require a deeper insight into real industrial problems, unmet needs and potential new research themes

Expected outcomes

On completion of this course you'll be able to:

- apply an understanding of how material properties, operating parameters and equipment design can have an influence on product properties
- manipulate operating parameters to influence materials properties and quality parameters
- recognise how fluid bed processes can be scaled up and appreciate the challenges in start-up and shut down
- understand how scientific principles can be applied to the processing of real industrial products for better performance, quality and economics
- learn from how challenges are tackled across different industries
- choose and design appropriate equipment for fluid bed processing
- learn from extensive academic and industrial experience, demonstrations, theory and real industrial case studies
- and, importantly learn from attendees what others are doing in the field of fluid bed processing

> "Fantastic introduction to fluid bed drying process. Been given lots of industry insights that have stimulated many development opportunities for our industry." **Volac International Ltd**

> "Great opportunity for me to learn about possibilities of this technology, beginning from the basics, practical experiments and real applications." **Fosfa a.s.**

> "A great combination of fundamental basics and years of industrial expertise." **Elanco**

Course director:
Professor David York, University of Leeds

Course co-director:
Dr Jim Bullock, Director, iFormulate Ltd

Programme

Monday 11 May 2020

Basic science and understanding

09.00 Registration and coffee

09.30 **Welcome and housekeeping**
Dr Jim Bullock, iFormulate Ltd

09.40 **Introduction to fluid bed processing**
Professor Andrew Bayly, University of Leeds (formerly of Procter and Gamble)

10.10 **Fluidisation basics**
Professor David York, University of Leeds (formerly of Procter and Gamble)

11.15 Coffee

11.30 **Benefit of mass transfer in the fluid bed**
Professor Andrew Bayly, University of Leeds (formerly of Procter and Gamble)

12.10 **Particle agglomeration in fluid beds**
Stephan Sternowsky, Neuhaus Neotec

12.50 Lunch

13.50 **Hands-on laboratory demonstrations**
Agglomeration and sintering
Nigel Somerville Roberts, NSR Innovations Ltd (formerly of Procter and Gamble) and visiting researcher, University of Leeds

Fluidisation and Geldart classifications
Soyeb Manga, University of Leeds

Continuous and batch operation
Professor David York, University of Leeds

15.35 Tea

15.50 **Fluid atomisation in fluid beds – basic science mechanisms**
Phil Threlfall-Holmes, TH Collaborative Innovation & Visiting Professor at the University of Leeds (formerly of AkzoNobel)

16.30 **Use and characteristics of twin fluid nozzles in fluid beds**
Stefan Gerstner, Schlick

17.00 **Importance of powder material properties in fluid beds**
Nigel Somerville Roberts, NSR Innovations Ltd (formerly of Procter and Gamble) and visiting researcher, University of Leeds

17.30 **Q&A and wrap up**

17.45 End of day one

19.00 Course Dinner

Tuesday 12 May 2020

Applications and case studies

09.00 Coffee

09.15 **Welcome**
Dr Jim Bullock, iFormulate Ltd

09.20 **Basics of fluid bed design**
Nigel Somerville Roberts, NSR Innovations Ltd (formerly of Procter and Gamble) and visiting researcher, University of Leeds

10.00 **Basic modelling for fluid bed processing**
Dr Ali Hassanpour, University of Leeds

10.40 Coffee

10.55 **Hands-on laboratory demonstrations**
Particle mixing, separation and attrition
Professor David York, University of Leeds

Spouted bed
Nigel Somerville Roberts, NSR Innovations Ltd (formerly of Procter and Gamble) and visiting researcher, University of Leeds

Encapsulation and coating
Veerle Timmerman, Xedev/ProCept

12.40 Lunch

13.30 **Fluid bed drying – mechanistic modelling and scale-up**
Ian Kemp, Consultant (previously GSK)

14.10 **How liquids spread, coat or agglomerate in fluid bed processing**
Professor Nik Kapur, University of Leeds

14.50 **Case studies of continuous and batch operation**
David Smith, DJS Process Consulting Ltd

15.30 Tea

15.45 **Case studies of continuous and batch operation**
Henning Falck, Neuhaus Neotec

16.10 **Powder morphology and powder performance – case study food 1: three-in-one coffee mix**
Tobias Kockel, Nestlé R&D Konolfingen, Switzerland

16.35 **Particle engineering and characterisation of output particles**
Lieselotte de Smet, Xedev

17.00 **Trouble shooting forum/ expert consultation session**
Q&A and networking drinks reception

18.00 End of day two

Wednesday 13 May 2020

Applications and case studies continued

09.00 Coffee

09.15 **Welcome**
Dr Jim Bullock, iFormulate Ltd

09.20 **Powder morphology and powder performance – case study food 2: thicken-up clear**
Tobias Kockel, Nestlé R&D Konolfingen, Switzerland

09.50 **Case study: fluid bed granulation modelling and scale-up**
Ian Kemp, Consultant (previously GSK)

10.30 Coffee

10.45 **Case study: particle coating and controlled release**
Barry Friend, Colorcon

11.25 **Case study: combining spray drying with a fluid bed**
Professor David York, University of Leeds and Nigel Somerville-Roberts, NSR Innovations Ltd

Expanding understanding and application of fluid beds

12.05 **Innovation example 1 – academic – structured fluid beds: towards more responsive processes**
Dr Victor Francia, Heriot-Watt University

12.45 Lunch

13.35 **Instrumentation and control: sensors, soft sensors and control loops**
Tobias Kockel, Nestlé R&D Konolfingen, Switzerland

14.15 **Innovation example 2 – industry – high gravity fluidized beds**
Prof. Dr. ir. Juray de Wilde, Université Catholique de Louvain (UCLouvain)

14.55 Tea and end of course

The full course details and online booking are now available from the course web page:

https://eps.leeds.ac.uk/short-courses

Further information

Venue
The course venue will be within the Faculty of Engineering and Physical Sciences at the University of Leeds.

Please note, car parking for visitors is unavailable at the University. The nearest public car park is Woodhouse Lane (multi-storey) at LS1 3HQ.

Course Fees
The following course fees include the cost of tuition, course materials, lunches and light refreshments for the days of attendance:

£999 – Monday 11 – Wednesday 13 May 2020

Accommodation
Delegates are responsible for their own accommodation (if required). A list of hotels close to the University will be sent out with the delegate joining instructions.

Course Dinner
The course dinner will be held at a Leeds city centre restaurant and is included in the course fee. This will take place on Monday evening and the dress code is smart casual.

Accessibility
Please let us know if you have any specific requirements including any access or dietary requirements in relation to this course.

How to Book
Booking for this course should be completed through our secure Online Store. To complete your booking please follow the instructions below:

1. Log on to our Online Store at: **https://store.leeds.ac.uk**
2. Select Conferences and Events in the left-hand navigation bar
3. Select CPD Faculty of Engineering and Physical Sciences
4. Select the course or event for which you wish to register and click on 'Book'
5. If you are a new user, please follow the instructions to register. If you already have an account log in as instructed
6. Complete the application process as directed by the booking system.

You will receive an automatic confirmation email within 24 hours of your booking.

Our privacy notice tells you what to expect us to do with your personal information when you make contact with us or use one of our services: **https://eps.leeds.ac.uk/privacy**

For online booking queries and for all other enquiries please contact:

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CPD, Conference and Events Unit, University of Leeds

Terms and conditions for booking

Payment by debit/credit card
Payment should be made at the time of booking via the Online Store.

Payment via purchase order and invoice
A purchase order document should accompany your booking form. Our standard terms of payment are 30 days from date of invoice, **however payment must be made prior to attendance**. Attendance may be refused if payment has not been received.

Changes made by the University of Leeds
The course programme may have to be re-scheduled or the speakers changed for reasons outside our control. The University of Leeds reserves the right to cancel or postpone a course, in which case fees will be refunded in full. In the event of cancellation, the University will not be held liable for delegates' travel or accommodation expenses.

Where a delegate cancels a registration
For cancellations made within seven days of booking: a full refund is payable unless the course starts within the next seven days, in which case the full fee is payable and no refunds will be made.

For cancellations made after seven days of booking: written cancellations received up to 15 working days before the course will be subject to an administrative charge of 20% of the total fee. Within 15 working days of the course the full fee is payable and no refunds will be made.

For non-attendance: the full fee is payable and no refunds will be made but copies of the course materials will be sent to the registered delegate. Substitutions may be made at any time.

Data/Privacy
Your right to privacy is important to us. We will only use your information to provide information on our CPD courses and relevant events. We will not pass your details on to any other organisations. The ways in which your personal data may be used when you provide it to us are defined in our Privacy Notice at **https://eps.leeds.ac.uk/privacy**

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