Draft Programme

Fluid Bed Processing

Wednesday 15 May 2019

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)
     • Overview and key features of fluid bed processing and key features
     • Objectives of processing and how/where it is used
     • Fluid bed designs – pros and cons
     • What can happen if it goes wrong
     • Introduction to the key scientific topics of the course

10:10  Fluidisation basics
     Professor David York, University of Leeds (formerly of Procter and Gamble)
     • Basics of fluidisation.
     • Particle properties, disengagement zone, elutriation, pressure drops
     • Includes a demonstration

11:10  Coffee

11:25  Benefit of mass transfer in the fluid bed
     Professor Andrew Bayly, University of Leeds (formerly of Procter and Gamble)
     • Drying and cooling operations
     • The importance of particle properties and interactions with the fluid bed

12:05  Particle agglomeration in fluid beds
     Dr Stephan Sternowsky, Neuhaus Neotec
     • Examples which illustrate the science of agglomeration

12:45  Lunch

13:45  Hands-on laboratory demonstration sessions

13:55  Demo a: Particle mixing and separation
     Umair Zafar, University of Leeds

14:30  Demo b: Fluidisation and Geldart Classifications
     Soyeb Manga, University of Leeds

15:05  Demo c: Continuous operation
     Professor David York, University of Leeds

15:40  Tea

15:55  Spraying and coating in fluid bed drying
     Professor Nik Kapur, University of Leeds
     • Mechanisms of wetting and spreading
     • Impact of shape and liquid properties

16:35  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
     • Geldart classification
     • Impact of size distribution, moisture and temperature
     • Characterisation
     • Causes and consequences of unintended agglomeration
17:05  **Particle engineering and characterisation of output particles**  
Lieselotte de Smet, Xedev/ProCept
17:35  Q&A and wrap up
17:50  **End of day one**
19:00  **Course Dinner**

**Thursday 16 May 2019**

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 Proctor and Gamble) and visiting researcher, University of Leeds  
- Influence of shape, distributor plates, weirs, air distribution, static and vibratory beds
  - Wurster design
  - Continuous vs batch operation
  - Cyclones, internal filters
10:00  **Basic modelling for fluid bed processing**  
Dr Ali Hassanpour, University of Leeds  
- DEM and CFD Models
- Heat balance
10:40  **Coffee**
10:55  **Hands-on laboratory demonstration sessions**
11:05  **Demo d: Pilot unit operation**  
Dr Stephan Sternowsky/Henning Falck, Neuhaus Neotec
11:40  **Demo e: Agglomeration and sintering**  
Nigel Somerville Roberts, NSR Innovations Ltd (formerly of Proctor and Gamble) and visiting researcher, University of Leeds
11:15  **Demo f: Encapsulation, coating and spouted bed**  
Veerle Timmerman, ProCept
12:40  **Lunch**
13:30  **Operation: start up and shut down and handling difficult materials**  
David Smith, DJS Process Consulting Ltd
14:15  **Case Study Pharma 1 – Developing Fluid Bed Granulation High Potent Drug Products**  
David O’Connell, PCI Pharma Services  
- Introduction to potent molecules
- Overview of contained manufacturing facility
- Specific contain equipment for fluid bed granulation
- Case study of a challenging product.
14:55  **Case Study Food**  
*Speaker to be confirmed*  
- Encapsulation of flavours, use of Wurster type bed
15:35  **Tea**
15:55  **Case Studies Food – powder morphology and powder performance**  
Tobias Kockel, Nestlé R&D Konolfingen, Switzerland
16:25  **Case Study Pharma 2 – Fluid Bed Processes in Pharmaceutical Coating and Granulation**  
Conor Long, Almac
17:05  **Case studies of continuous and batch operation**  
Henning Falck, Neuhaus Neotec  
- Pros and cons of continuous vs batch
17:30  **Panel Discussion (all speakers): Future challenges and opportunities**
17:55  Q&A and wrap up
18:05  Drinks and poster reception
19:30  **End of day two**

**Friday 17 May 2019**

**Innovation and New Horizons**

09:00  **Coffee**
09:15  **Welcome**  
Dr Jim Bullock, iFormulate Ltd
09:20  **Innovation Example 1 - Academic - Structured fluid beds: Towards more responsive processes**  
Dr Victor Francia, Heriot-Watt University
10:00 **Instrumentation and Control: sensors, soft sensors and control loops**
   Tobias Kockel, Nestlé R&D Konolfingen, Switzerland

10:40 **Coffee**

11:00 **Case Study: combining spray drying with a fluid bed**
   Professor David York, University of Leeds and Nigel Somerville Roberts, NSR Innovations Ltd

11:40 **Innovation example 2 – Industry – High gravity fluid beds**
   Prof. Dr. ir. Juray De Wilde, Université Catholique de Louvain (UCLouvain)

12:10 Troubleshooting and Q&A

13:00 **Lunch**

14:00 **End of course**