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
Particle engineering and characterisation of output particles
Lieselotte de Smet, Xedev/ProCept

Q&A and wrap up

End of day one

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

12:15 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 1 - powder morphology and powder performance
Tobias Kockel, Nestlé R&D Konolfingen, Switzerland

15:25 Tea

15:45 Case Study Food 2 – powder morphology and powder performance
Tobias Kockel, Nestlé R&D Konolfingen, Switzerland

16:15 Case Study Pharma 2 – Fluid Bed Processes in Pharmaceutical Coating and Granulation
Conor Long, Almac

16:55 Case studies of continuous and batch operation
Henning Falck, Neuhaus Neotec
- Pros and cons of continuous vs batch

17:20 Panel Discussion (all speakers): Future challenges and opportunities

17:45 Q&A and wrap up

17:55 Drinks and poster reception

19:20 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