**Tuesday 20 March 2018**

**Spray Drying and Atomisation Basics**

<table>
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<th>Time</th>
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<tr>
<td>09:00</td>
<td><strong>Registration and coffee</strong></td>
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| 09:30 | **Welcome and group introduction** – What do delegates want to get from the course?  
Dr Jim Bullock, iFormulate Ltd |
| 09:40 | **Introduction to spray drying, how does it compare with other drying techniques, mechanisms and impact of the Formulation on process and plant design**  
Professor David York, University of Leeds (formerly of Procter and Gamble) |
| 10:20 | **Fluid properties and rheology**                                      
Professor Andrew Bayly, University of Leeds (formerly of Procter and Gamble) |
| 11:00 | **Atomisation**                                                        
Professor Phil Threlfall-Holmes, TH Collaborative Innovation & Visiting Professor at the University of Leeds, (formerly of AkzoNobel) |
| 11:40 | **Coffee**                                                             |
| 11:55 | **Drying and Congealing the particle**                                 
Filip Van der Gucht, ProCept |
| 12:45 | **Spray drying hazards and safe operation**                            
Mike Halliday, HSD Safety Ltd |
| 13:20 | **Lunch**                                                              |
| 14:05 | **Hands-on laboratory demonstration sessions**                          |
|       | (a) **Feedstock/Rheology**: Professor Andrew Bayly, University of Leeds |
|       | (b) **Particle Sizing**: Dr Tina Bonakdar, University of Leeds          |
|       | (c) **Drying Parameters**: Filip Van der Gucht, ProCept                  |
|       | (d) **Atomisation**: Dr Phil Threlfall-Holmes, TH Collaborative Innovation & Visiting Professor, University of Leeds, (formerly of AkzoNobel) |
|       | (e) **Characterisation of spray dried powders**: Professor David York  |
|       | (f) **Avoiding extreme behaviour of materials**: Mike Halliday, HSD Safety Ltd |
| 15:50 | **Tea**                                                                |
| 16:10 | **Spray drying: Basic models, energy balance**                          
Professor Andrew Bayly, University of Leeds |
| 16:40 | **Scale up of spray drying processes**                                 
Henrik Schwartzbach, GEA |
| 17:10 | **Water in our World, Water in our Materials**                         
Dr Daryl Williams, Imperial College London |
| 17:45 | **End of day one**                                                     |
| 19:00 | **Course Dinner**                                                      |

**Wednesday 21 March 2018**

**Industrial Formulation Case Studies**

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<tr>
<td>08:45</td>
<td><strong>Coffee</strong></td>
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| 09:00 | **Welcome**                                                            
Dr Jim Bullock, iFormulate Ltd |
| 09:10 | **Phase changes in spray drying**                                      
Professor David York, University of Leeds |
| 09:35 | **Spray drying with two-fluid nozzles; atomisation, scale-up and modelling**  
Ian Kemp, GSK |
10:10 Coffee
10:25 Agglomeration, build-up and the potential for charring in the spray drying tower
Luis Martin de Juan, Procter and Gamble
11:00 Spray drying of pharmaceuticals
Andrew Naylor, Upperton
11:35 Application of spray dried materials in the pharmaceutical industry – what, where and how much?
Andrew Parker, Juniper Pharma Services
12:10 Processing science in an infant milk formulae factory
Koen van Dijke, Danone
12:45 Lunch
13:30 Hands-on laboratory demonstration sessions
(a) Feedstock/Rheology: Professor Andrew Bayly, University of Leeds
(b) Particle Sizing: Dr Tina Bonakdar, University of Leeds
(c) Drying Parameters: Jim Tyzack and Ben de Schepper on behalf of Filip Van der Gucht, ProCept
(d) Atomisation: Dr Phil Threlfall-Holmes, TH Collaborative Innovation & Visiting Professor, University of Leeds, (formerly of AkzoNobel)
(e) Characterisation of spray dried powders: Professor David York
(f) Avoiding extreme behaviour of materials: Mike Halliday, HSD Safety Ltd
15:15 Tea
15:35 Modelling of the spray drying process using empirical inputs
Henrik Schwartzbach, GEA
16.10 Cyclone design and operation
Professor Mojtaba Ghadiri, University of Leeds
16:45 Engineering particle structure and applications
Professor Andrew Bayly, University of Leeds
17.20 Panel Discussion (all speakers): Future challenges and opportunities
17.30 Wrap-up: What would delegates still like covering?
17.40 Networking Drinks Reception, Nibbles and Poster Session
18.30 End of day two

Thursday 22 March 2018
Powder finishing, modelling and future developments

08.45 Coffee
09.05 Welcome
Dr Jim Bullock, iFormulate Ltd
09.15 Managing moisture in practice
Dr Tobias Kockel, Nestle Ireland
09.50 Product design by fluid bed systems as downstream units of spray dryers
Henning Falck, Neuhaus Neotec
10.20 Coffee
10.40 Modelling and scale up of spray drying
Dr Pedro Valente, Hovione
11.10 Future directions in atomisation technologies for pharmaceutical applications
Dr Pedro Valente, Hovione
11.45 Spray drying process development: Combining targeted experiments with a model-based approach
Dr David Slade, Process Systems Enterprise Ltd (PSE)
12.15 Lunch
13.15 Trouble shooting forum
15.00 Coffee and close