Faculty of Engineering and Physical Sciences

UNIVERSITY OF LEEDS

Spray Drying and Atomisation of Formulations

Tuesday 14 – Thursday 16 June 2022

image courtesy of GEA

image courtesy of ProCept

COURSE EXPERTLY PRESENTED BY 6 ACADEMIC AND 13 INDUSTRIAL SPEAKERS FROM 7 DIFFERENT COUNTRIES AND WITH OVER 400 YEARS CUMULATIVE EXPERIENCE!

Supported by:

iFormulate

Spray Drying and Atomisation of Formulations

Tuesday 14 – Thursday 16 June 2022

About the course

A practical course involving live and/or pre-recorded demonstrations, theory and real industrial case studies.

Day 1: Spray drying and atomisation basics: Industry and academic experts provide the essential scientific background as well as pre-recorded and/or practical hands-on laboratory demonstrations.

Day 2: Industrial formulation case studies: Experienced specialists will show how the science of spray drying has been applied to influence the properties of real formulated products across a wide range of business sectors. Including more laboratory demonstrations.

Day 3: Powder finishing, modelling and future development of spray drying.

The course includes an interactive troubleshooting forum. Participants are invited to bring their challenges, questions and problems to a panel of experts. As well as enabling constructive answers to specific queries we also find that the questions are usually interesting enough to lead to a wider discussion of general interest.

Intended audience

- R&D scientists in industries such as pharmaceuticals, detergents, foods, agrochemicals and pigments who are working in product formulation and who need a broad overview to the subject of spray drying and atomisation.
- Scientists and chemical engineers who would value a deeper understanding of how science can be applied to real spray-drying problems.
- Process technologists, plant managers, R&D and process technicians who need a thorough practical grounding in the subject of spray drying and how it can influence the properties of formulated products.
- Plant and process engineers from contract manufacturers who are seeking process improvements and efficiencies.
- University researchers who require a deeper insight into real industrial problems, unmet needs and potential new research themes.

Expected outcomes

- Gain an appreciation of how the choice of formulation composition can impact processing and product quality.
- Apply an understanding of how fluid properties, rheology and atomisation performance can have an influence on spray drying.
- Learn how to manipulate drying parameters to influence product microstructure, materials properties and quality parameters.
- Gain an appreciation of the hazards involved in spray drying and how to ensure safe operation.
- Learn how spray drying processes can be scaled up and appreciate the possible pitfalls on scaling up.
- Understand how spray drying principles can be applied to the manufacture of real industrial formulated products for economic and better performing processes as well as improved product performance and quality.
- Gain an insight into how challenges are tackled across different industries.
- Learn how to choose and design appropriate equipment such as atomisers and towers for laboratory, pilot and production-scale spray-drying.

Course Director

Professor Andrew Bayly, University of Leeds

Course co-director:

Dr Jim Bullock, Director, iFormulate Ltd

What our previous delegates say:

"The course was excellent. I feel like I know considerably more about the process than I did when first arriving on the course."

"A great overview of spray drying covering a range of relevant topics with cross industry examples that brought the theory to life."

"A really great course for anyone involved in spray drying, whether you are new to the instrumentation or have been working with it for several years. I would highly recommend this course."

Programme

Tuesday 14 June 2022

Spray Drying and Atomisation Basics

09:00 Registration and coffee

09:30 **Welcome and group introduction – what do delegates want to get from the course?**
Dr Jim Bullock, iFormulate Ltd UK

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**
Visiting 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 Coffee

11:20 **Atomisation**
Professor Phil Threlfall-Holmes, TH Collaborative Innovation & Visiting Professor at the University of Leeds (formerly of AkzoNobel)

12:00 **Drying the particle**
Filip Van der Gucht, ProCept

12:30 **Modern approaches towards explosion safety in spray dryers**
Gerrit Fikse, REMBE

13:00 Lunch

13:45 **Hands-on and/or pre-recorded laboratory demonstration sessions**
D1 – Feedstock/rheology
Professor Andrew Bayly

D2 – Atomisation
Professor Phil Threlfall-Holmes

D3 – Characterisation of spray dried powders
Professor David York

D4 – Particle sizing
Dr Ben Douglas, University of Leeds

D5 – Drying parameters
Filip van der Gucht

D6 – Single Droplet
Dr Karrar Al Dirawi, University of Leeds

15:35 Tea

15:55 **Spray drying: basic models, energy balance**
Professor Andrew Bayly

16:20 **Scale up of spray drying processes**
Henrik Schwartzbach, GEA Process Engineering

16:50 **Water in our world, water in our materials**
Dr Daryl Williams, Imperial College London

17:25 End of day one

Wednesday 15 June 2022

Industrial Formulation Case Studies

08:45 Coffee

09:00 **Welcome**
Dr Jim Bullock

09:10 **Phase changes in spray drying**
Professor David York

09:35 **Spray drying with two-fluid nozzles; atomisation, scale-up and modelling**
Ian Kemp, Consultant, previously GSK

10:20 Coffee

10:40 **Engineering particle structure**
Professor Andrew Bayly

11:15 **Beyond freeze drying: insights into the development of protein pharmaceuticals via spray-drying**
Joana Pinto, RCPE GmbH

11:45 **Spray drying an alternative to freeze drying**
Dr Sune Klint Andersen, Jannsen Pharmaceuticals

12:25 **Modelling of the spray drying process using empirical inputs**
Henrik Schwartzbach

13:00 Lunch

13:45 **Hands-on and/or pre-recorded laboratory demonstration sessions**
D1 – Feedstock/rheology
Professor Andrew Bayly

D2 – Atomisation
Professor Phil Threlfall-Holmes

D3 – Characterisation of spray dried powders
Professor David York

D4 – Particle sizing
Dr Ben Douglas

D5 – Drying parameters
Filip van der Gucht

D6 – Single Droplet
Dr Karrar Al Dirawi, University of Leeds

15:35 Tea

15:55 **Processing science in an infant milk formulae factory**
Dr Arend Dubbelboer, Danone

16:30 **Spray drying for encapsulation and congealing**
Filip van der Gucht

17:00 **Trouble shooting forum/expert consultation session**

17:30 End of day two

Thursday 16 June 2022

Powder finishing, modelling and future developments

08.45 Coffee

09:00 **Welcome**
Dr Jim Bullock

09:10 **Agglomeration and build-up in the spray drying tower**
Victor Francia, Heriot Watt University

09:40 **Managing moisture in practice**
Sophie Samain, Nestlé Switzerland

10:10 **Product design by fluid bed systems as downstream units of spray dryers**
Henning Falck, Neuhaus Neotec

10:40 Coffee

11:00 **Dryer operation and operational challenges**
George Svonja/Deon Pistorius, Dedert

11:30 **Modelling and scale up of spray drying**
Dr Pedro Valente, Hovione

12:00 **Process analytical technologies in Spray Drying**
Dr Pedro Valente

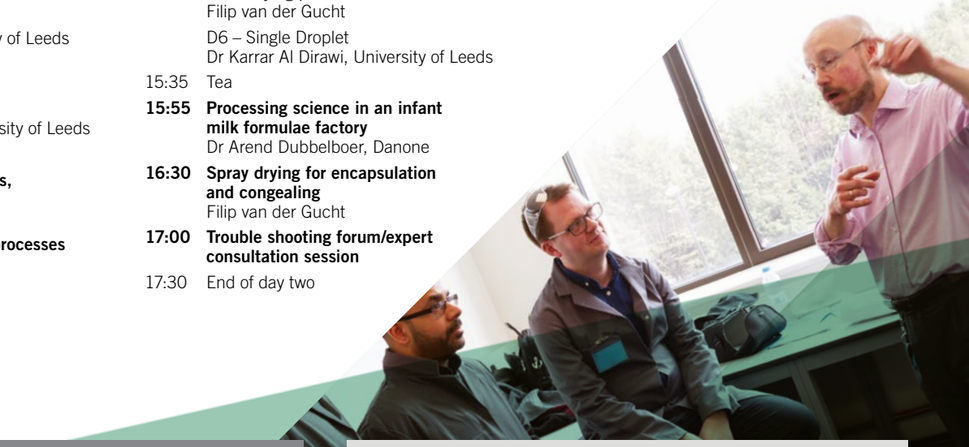
12:35 Lunch

13:15 **Online digital modelling, monitoring & control**
Dr David Slade, Applied Materials

13:45 **Particle separation; cyclones, filters etc**
Professor David York

14:20 Tea and close

Please note, although we remain devoted to the programme specified, we reserve the right to vary the programme in detail if required to do so by factors beyond our control.



View the full programme and book your place online at **http://eps.leeds.ac.uk/short-courses**

100% of 2021 respondents said they would recommend the course to colleagues

Further information

Course Fees

The following course fees include the cost of tuition, course materials, lunches and light refreshments:

£999 Tuesday 14 – Thursday 16 June 2022

Venue

The course venue will be within the Faculty of Engineering and Physical Sciences at the University of Leeds. The University campus is a 20 minute walk from Leeds city train station.

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

Accommodation

Delegates are responsible for their own accommodation and a list of hotels close to the University will be sent out with the joining instructions.

How to Book

Please book your place for this course through our secure Online Store, using debit or credit card, following the instructions below:

1. Visit our Online Store at: http://store.leeds.ac.uk
2. Select Conferences and Events in the left-hand navigation bar and 'CPD Faculty of Engineering and Physical Sciences'
3. Select the relevant course, click on 'Book Event' and complete your booking details

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

Get in touch

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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.

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.

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.

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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