

Faculty of Engineering



UNIVERSITY OF LEEDS

# Spray Drying and Atomisation of Formulations

Tuesday 28 – Thursday 30 March 2017



Supported by:



**EARLY REGISTRATION  
IS RECOMMENDED  
2016 COURSE WAS FULLY BOOKED**

# Spray Drying and Atomisation of Formulations

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## About the course

A practical course involving 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 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:** Half day to look at powder finishing, modelling and future development of spray drying. The course finishes with an optional trouble shooting forum to discuss questions which have arisen during the course.

**During the course there will be an opportunity to discuss problems/ individual challenges for discussion with experts in the field.**

## 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.

“An excellent introduction to spray drying and atomisation of formulations.” **Syngenta**

“100% of 2016 respondents said they would recommend the course to their colleagues.”

## 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 David York, University of Leeds

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

“An excellent, information packed course allowing participants to hear from industry and academic experts, and share ideas with delegates from other industries.” **GSK**

“Great overview of spray drying, across a broad range of industries and applications.” **Unilever**

## Programme

### Tuesday 28 March 2017

#### Spray Drying and Atomisation Basics

09:00	Registration and coffee
09:30	<b>Welcome and group introduction – What do delegates want to get from the course?</b> Dr Jim Bullock, iFormulate Ltd
09:40	<b>Introduction to spray drying, how it compares with other drying techniques, mechanisms and impact of the formulation on process and plant design</b> Professor David York, University of Leeds (formerly of Procter and Gamble)
10:20	<b>Fluid properties and rheology</b> Professor Andrew Bayly, University of Leeds (formerly of Procter and Gamble)
11:00	<b>Atomisation</b> Professor Phil Threlfall-Holmes, TH Collaborative Innovation & Visiting Professor, University of Leeds (formerly of AkzoNobel)
11:40	Coffee
11:55	<b>Drying the particle</b> Filip Van der Gucht, ProCept
12:35	<b>Spray drying hazards and safe operation</b> Mike Halliday, HSD Safety Ltd
13:10	Lunch
13:55	<b>Hands-on laboratory demonstrations</b> <b>Feedstock/Rheology</b> Professor Andrew Bayly, University of Leeds <b>Atomisation</b> Professor Phil Threlfall-Holmes, TH Collaborative Innovation & Visiting Professor, University of Leeds (formerly of AkzoNobel) <b>Characterisation of spray dried powders</b> Professor David York, University of Leeds <b>Avoiding extreme behaviour of materials</b> Mike Halliday, HSD Safety Ltd <b>Particle Sizing</b> Dr Tina Bonakdar, University of Leeds <b>Drying Parameters</b> Filip Van der Gucht, ProCept
15:40	Tea
16:00	<b>Spray drying: Basic models, energy balance</b> Professor Andrew Bayly, University of Leeds
16:20	<b>Scale up of spray drying processes</b> Henrik Schwartzbach, GEA Process Engineering A/S
16:50	<b>The importance of moisture</b> Dr Daryl Williams, Imperial College London
17:25	<b>Wrap up of day 1</b> Dr Jim Bullock, iFormulate Ltd
17:35	End of day one
19:00	Course Dinner

### Wednesday 29 March 2017

#### Industrial Formulation Case Studies

08:45	Coffee
09:00	<b>Welcome</b> Dr Jim Bullock, iFormulate Ltd
09:10	<b>Phase changes in spray drying</b> Professor David York, University of Leeds
09:35	<b>Spray drying with two-fluid nozzles; atomisation, scale-up and modelling</b> Ian Kemp, GSK
10:10	Coffee
10:25	<b>Agglomeration, build-up and the potential for charring in the spray drying tower</b> Luis Martin de Juan, Procter and Gamble
11:00	<b>Spray drying of pharmaceuticals</b> Nikki Whitfield, Quotient
11:35	<b>Application of spray dried materials in the pharmaceutical industry – what, where and how much?</b> Andrew Parker, Juniper Pharma Services
12:10	<b>Spray drying biomolecules at the bench-top scale</b> Geoffrey Lee, Erlangen University
12:45	Lunch
13:30	<b>Hands-on laboratory demonstrations</b> <b>Feedstock/Rheology</b> Professor Andrew Bayly, University of Leeds <b>Atomisation</b> Professor Phil Threlfall-Holmes, TH Collaborative Innovation & Visiting Professor, University of Leeds (formerly of AkzoNobel) <b>Characterisation of spray dried powders</b> Professor David York, University of Leeds <b>Avoiding extreme behaviour of materials</b> Mike Halliday, HSD Safety Ltd <b>Particle Sizing</b> Dr Tina Bonakdar, University of Leeds <b>Drying Parameters</b> Filip Van der Gucht, ProCept
15:15	Tea
15:35	<b>Modelling of the spray drying process using empirical inputs</b> Henrik Schwartzbach, GEA Process Engineering A/S
16:10	<b>Cyclone science and improving product recovery in spray drying processes</b> Dr Julio Paiva, Advanced Cyclone Systems, Porto
16:45	<b>Spray drying for encapsulation and congealing</b> Filip Van der Gucht, ProCept
17:05	<b>Panel Discussion (all speakers): Future challenges and opportunities</b>
17:15	<b>Wrap-up: What would delegates still like covering?</b>
17:25	Networking Drinks Reception, Nibbles and Poster Session
18:30	End of day two

### Thursday 30 March 2017

#### Powder finishing, modelling and future developments

08:45	Coffee
09:05	<b>Welcome</b> Dr Jim Bullock, iFormulate Ltd
09:15	<b>Managing moisture in practice</b> Dr Tobias Kockel, Nestlé Ireland
09:50	<b>Product design by fluid bed systems as downstream units of spray dryers</b> Henning Falck, Neuhaus Neotec
10:20	Coffee
10:40	<b>Engineering particle structure</b> Professor Andrew Bayly, University of Leeds
11:15	<b>Modelling and scale up of spray drying</b> Dr Pedro Valente, Hovione
11:50	<b>Future directions in atomisation technologies for pharmaceutical applications</b> Dr Pedro Valente, Hovione
12:20	<b>Utilising advanced process modelling for process improvement and scale-up of spray drying operations</b> Dr David Slade, Process Systems Enterprise Ltd (PSE)
12:50	Lunch
13:45	<b>Trouble shooting forum</b>
15:00	Coffee and close

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



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

[www.engineering.leeds.ac.uk/short-courses](http://www.engineering.leeds.ac.uk/short-courses)

# Further information

## Venue

The course venue will be within the Faculty of Engineering 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, light refreshments and the course dinner.

Bookings made on or before Friday 10 February 2017: **£940** (VAT exempt)  
Bookings made after Friday 10 February 2017: **£990** (VAT exempt)

## 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 Tuesday 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.
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.

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

**Jenny Carter**

CPD, Conference & Events Coordinator

CPD, Conference & Events Unit

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**W:** [www.engineering.leeds.ac.uk/short-courses](http://www.engineering.leeds.ac.uk/short-courses)

**Twitter:** @LeedsUniCPD



## Terms and conditions for booking

Payment in full should accompany your booking. The course fee is exempt from VAT. Fees must be paid in full no later than 15 working days before the course commences. Failure to pay may result in attendance being refused.

Registrations are accepted on the understanding that the printed programme is given in good faith but 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 the 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.

Delegates will receive a full refund for cancellations made within 7 days of online booking, except where the booking has been made for an event commencing within the next 7 days. Where a delegate wishes to cancel a registration after this 7 day period, written cancellations received up to 15 working days before the course will be subject to an administrative charge of 20% of the total remittance. After this date the full fee is chargeable and no refunds will be made, this also applies for non-attendance but copies of the course documents will be sent. Substitutions may be made at any time.

If you are unable to complete your registration using the online booking system please contact the CPD, Conference & Events Unit to discuss alternative arrangements.