

Faculty of Engineering  
and Physical Sciences



UNIVERSITY OF LEEDS

# Spray Drying and Atomisation of Formulations

Tuesday 13 – Thursday 15 June 2023

Supported by:



# Spray Drying and Atomisation of Formulations

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## Course Director

Professor Andrew Bayly, University of Leeds

## Course co-director:

Dr Jim Bullock, Director, iFormulate Ltd

## About the course

A practical three day course including real industrial case studies, theoretical presentations and demonstrations.

**Day one:** Spray drying and atomisation basics: Industry and academic experts provide the essential scientific background as well as practical hands-on laboratory demonstrations.

**Day two:** 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 three:** Powder finishing, modelling and future developments of spray drying.

**During this course participants will have the opportunity to discuss their challenges, questions and problems with a panel of industry specialists through our dedicated trouble shooting forum.**

## Who should attend

- 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.

## What our previous delegates say:

“An excellent overview of the challenges posed by spray drying” **GEA Process**

“Provides good further understanding of spray drying with an excellent mix of people from various industries” **Johnson Matthey**

“If you’re working with spray dryers, you should almost oblige yourself to participate in this course – lots learnt and discussed!” **Aphea.Bio**

## Programme

### Tuesday 13 June 2023

#### 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
- 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**  
Dr Jim Bullock, iFormulate Ltd
- 10:20 Fluid properties and rheology**  
Professor Andrew Bayly, University of Leeds, formerly of Procter and Gamble
- 11:00 Coffee
- 11:20 Atomisation – an introduction**  
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 safety in spray dryers**  
Speaker to be confirmed
- 13:00 Lunch
- 13:45 Hands-on Laboratory Demonstrations**
- Feedstock/rheology
  - Atomisation
  - Characterisation of spray dried powders
  - Particle sizing
  - Drying parameters
  - Single droplet
- 15:35 Tea
- 15:55 Water in our world, water in our materials**  
Dr Daryl Williams, Imperial College London
- 16:25 Online digital modelling, monitoring & control**  
Dr David Slade, Applied Materials
- 16:55 Scale up of spray drying processes**  
Henrik Schwartzbach, GEA Process Engineering A/S
- 17:25 End of day one
- 19:00 Course Dinner

### Wednesday 14 June 2023

#### Industrial Formulation Case Studies

- 08:45 Coffee
- 09:00 Welcome**  
Dr Jim Bullock, iFormulate Ltd
- 09:10 Spray drying with two-fluid nozzles; atomisation, scale-up and modelling**  
Ian Kemp, Consultant, previously GSK
- 09:55 Engineering particle structure**  
Professor Andrew Bayly, University of Leeds, formerly of Procter and Gamble
- 10:35 Coffee
- 10:55 Beyond freeze drying: insights into the development of protein pharmaceuticals via spray-drying**  
Professor Amrit Paudel, RCPE GmbH
- 11:25 Pharmaceutical spray drying case studies**  
Dr Sune Klint Andersen, Janssen Pharmaceuticals
- 11:55 Modelling of the spray drying process using empirical inputs**  
Henrik Schwartzbach, GEA Process Engineering A/S
- 12:30 Lunch
- 13:35 Hands-on Laboratory Demonstration**
- Feedstock/rheology
  - Atomisation
  - Characterisation of spray dried powders
  - Particle sizing
  - Drying parameters
  - Single droplet
- 15:25 Tea
- 15:45 Processing science in an infant milk formulae factory**  
Emmanuelle Costard, Danone
- 16:15 Spray drying for encapsulation and congealing**  
Filip van der Gucht, ProCept
- 16:45 Trouble shooting forum/ expert consultation session**
- 17:15 Drinks reception
- 18:15 End of day two

### Thursday 15 June 2023

#### Powder finishing, modelling and future developments

- 08:45 Coffee
- 09:00 Welcome**  
Dr Jim Bullock, iFormulate Ltd
- 09:10 Agglomeration and build-up in the spray drying tower**  
Stefan Egan, Procter & Gamble
- 09:40 Managing moisture in practice**  
Tobias Kockel, Nestlé Switzerland
- 10:10 Spray granulation – how to spray dry on particles**  
Tom Wytrowski, Amandus Kahl
- 10:40 Coffee
- 11:00 Dryer operation and operational challenges**  
Deon Pistorius, Dedert International (UK)
- 11:30 Case study & Route cause analysis: Clumping lemon juice powder, a humidity problem?**  
Gesine Harms, Kerry
- 12:00 Modelling and scale-up of spray drying**  
Dr Paulo Francisco, Hovione
- 12:35 Lunch
- 13:20 Digitalisation in Food, Beverage and FMCG industries: Driving productivity bonus via physical science-based digital twin**  
Hassan Abdullahi, SPSE
- 13:50 Particle separation; cyclones, filters etc**  
Professor Andrew Bayly, University of Leeds
- 14:25 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 2022 respondents said they would recommend the course to colleagues

## Further information

### Course Fees

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

**£1099** Tuesday 13 – Thursday 15 June 2023

### Venue

This course will take place 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


**Harriet Wills** – Course Coordinator  
CPD, Conference and Events Unit  
Faculty of Engineering and Physical Sciences  
University of Leeds

T: +44 (0)113 343 2494

E: [cpd@engineering.leeds.ac.uk](mailto:cpd@engineering.leeds.ac.uk)

W: <https://eps.leeds.ac.uk/short-courses>

 [@LeedsUniCPD](https://twitter.com/LeedsUniCPD)

 [CPD, Conference and Events Unit,  
University of Leeds](https://www.linkedin.com/company/leeds-university-cpd)

## Terms and conditions for booking

### Payment

Payment by debit/credit card should be made at the time of booking via the Online Store. If for exceptional reasons you are unable to book and pay online a purchase order document will be required to support a manual booking process. Our standard payment terms 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.

### 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.

### 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. Appropriate course materials will be sent to the registered delegate.

In the event of cancellation, the University will not be held liable for or refund any incurred travel or accommodation expenses. Substitutions may be made at any time.

### 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>.

If you have opted in to receive details of future CPD courses from us you can unsubscribe at any time by emailing us at [cpd@engineering.leeds.ac.uk](mailto:cpd@engineering.leeds.ac.uk) and your details will be removed from our database.



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University of Leeds  
Leeds, United Kingdom  
LS2 9JT  
0113 243 1751  
[www.leeds.ac.uk](http://www.leeds.ac.uk)