

Faculty of Engineering



UNIVERSITY OF LEEDS

Microencapsulation

Tuesday 18 – Thursday 20 June 2019

100%
of 2018 respondents
said they would
recommend this
course to colleagues

Microencapsulation

Tuesday 18 – Thursday 20 June 2019

About the course

This course covers the basic science and engineering of microencapsulation across a wide range of applications including the important stages of emulsification control, stability and release property control. Whilst the majority of the course involves emulsions, multiple emulsions and particle coating, we also provide a comprehensive description of the range of characterisation tools and their applicability. The emphasis is on understanding the fundamental behaviour of the interactions of the various components in such complex systems. This should provide the basis for a rational approach to formulating and producing micro encapsulates to meet a range of needs.

The course was fully redeveloped in 2017 offering a programme of academic and industry cooperation taking delegates from the basic science through to manufactured products. The programme also includes interactive demonstrations, industry presentations and the opportunity for delegates to bring posters for discussion with the course cohort, speakers and PhD students.

Who should attend

Scientists and engineers in the chemical, petroleum, polymers, coatings, inks, food, pharmaceutical, cosmetics, and general chemical industries with responsibility for R&D projects, process engineering, manufacturing or product formulation involving incorporating micro-encapsulates into formulated products.

Learning objectives

On completion of this short course, you will have an understanding of:

- developing a rational approach to formulate or modify emulsions for optimal processing behaviour and use available laws and scaling relations to predict behaviour.
- the various methods to turning emulsions into encapsulates, including the process conditions that impact their final properties and behaviour.
- selecting characterisation devices and defining measurement procedures for a specific application.
- evaluating and interpreting experimental data.

Course Directors

Professor David York, University of Leeds

(formerly of Procter & Gamble)

David York is a chemical engineer with 36 years industrial experience in particle technology in P&G which included research, development and plant startups in spray drying, both co and counter current units for a wide variety of products. He is also an expert in agglomeration, microencapsulation and has over 45 publications and over 30 patent applications. He now holds the chair of structured particulate materials at the University of Leeds, is a Fellow of the Royal Academy of Engineering. He has developed numerous micro encapsulates whilst in his previous employment at P&G all the way through to full scale manufacturing, was part of an EU consortium on micro encapsulation and ran numerous research projects within academia before moving to Leeds.

Dr Olivier Cayre, University of Leeds

Olivier Cayre has 17 years experience in colloid and particle science. He obtained his PhD from the colloid and surfactant group at the University of Hull and worked in the same areas both at North Carolina State University (US) and at the School of Chemical and Process Engineering at the University of Leeds, where he is now an associate professor.

Dr Cayre is the author of over 50 refereed publications and patents in collaboration with a large range of academic and industrial partners. The main research interests of Dr Cayre's group lie in the fields of colloid and polymer engineering. These include product formulation, interfacial adsorption of surfactants, polymers and particulates, encapsulation, design and synthesis of functional particulates and their directed or self-assembly in suspension and at interfaces. He has worked on designing polymer and colloidal systems for applications in, for example, personal and home care products, lubrication, electrophoretic displays, pharmaceuticals, coatings and paints.

Dr Cayre has worked extensively with major multinational companies on these projects and led the development of novel particulate products with Merck Chemicals and Procter & Gamble for example.

Tuesday 18 June

Basic science and key points around microencapsulation – what you need to know to get started

09.00 Registration

09.30 Introduction to the course

09.40 Map to guide you through the course: microencapsulation methods vs product requirements
Professor David York
University of Leeds

10.20 Important properties of system to encapsulate (Hansen solubility parameter)
Professor Steven Abbott
TCNF & University of Leeds

11.00 Coffee

11.20 Important properties of microcapsules (type, shape, size, release characteristics, strength)
Dr Olivier Cayre
University of Leeds

Spray drying

12.00 Introduction to spray drying for encapsulations
Professor Andrew Bayly
University of Leeds

12.40 Lunch

13.40 Droplets and sprays in encapsulation: background in forming droplets from nozzles and common process units
Professor Nik Kapur
University of Leeds

14.20 Demonstration session 1
Spray drying
Professor David York
University of Leeds

Highly-upscaled, size-controlled microencapsulation: step emulsification
Alessandro Ofner, Microcaps, Zurich
Gelatin/complex coacervation
Soyeb Manga
University of Leeds

Metal shell capsules preparation – achieving retention and triggered release of small volatile actives
James Hitchcock,
University of Leeds

15.35 Tea

Coating of particles

15.55 Coating of solid particles
Professor Nik Kapur
University of Leeds

16.30 End of day one

19.00 Course dinner

Wednesday 19 June

Coating of particles continued

09.00 Process – fluid bed coaters, pan coaters
Professor David York
University of Leeds

09.40 Industry presentation on coating of solid particles using fluid beds
Dr. Stephan Sternowsky
Neuhaus Neotec

10.30 Coffee

Emulsion-based methods

10.50 How to decide on an affordable microencapsulation method – economics behind encapsulation
Professor David York
University of Leeds

11.30 Emulsion theory, importance of miscibility/cLogP, how useful is HLB of surfactants, Pickering emulsions/colloidosomes
Professor Brent Murray
University of Leeds

12.10 Lunch

13.10 Introduction on what the rest of the course will focus on regarding these methods – focus on emulsion-based encapsulation methods
Dr Olivier Cayre
University of Leeds

13.20 Complex Coacervation Methods
Alex Kerr, Micropore

14.00 Demonstration session 2
Spray drying
Professor David York
University of Leeds
Highly-upscaled, size-controlled microencapsulation: step emulsification
Alessandro Ofner, Microcaps, Zurich

Gelatin/complex coacervation
Soyeb Manga
University of Leeds

Metal shell capsules preparation – achieving retention and triggered release of small volatile actives
James Hitchcock,
University of Leeds

15.15 Tea

15.35 Droplet size control theory, importance of surface energy, viscosity and size of molecules
Professor Megan Povey
University of Leeds

16.15 Industry presentation – Application of emulsion based methods
Susana Fernandez Prieto
P&G Brussels

16.55 Poster/wine reception followed by end of day two

Thursday 20 June

Emulsion-based methods

Turning emulsions into core-shell microcapsules

09.00 Key properties and evaluation I
Dr Olivier Cayre
University of Leeds

09.30 Interfacial polymerisation: traditional vs potential of living radical polymerisation methods
Soyeb Manga,
University of Leeds

10.10 Coffee

10.30 Pickering emulsions for food applications with emphasis on the controlled delivery of actives
Fotis Spyropoulos
University of Birmingham

11.30 Size controlled microencapsulation at industrial scale
Alessandro Ofner, Microcaps, Zurich

12.10 Title to be confirmed
Givaudan

12.50 Lunch

13.50 Key properties and evaluation II
Nicole Hondow
University of Leeds

14.20 Forming barriers on droplet and particle surfaces
Dr Olivier Cayre
University of Leeds

15.00 Evaluating mechanical properties and release rates – techniques, challenges and watch outs
Professor David York/
Dr Olivier Cayre
University of Leeds

15.40 Optional lab tour

16.30 End of day three and course

What our previous delegates say:

“The course was comprehensive and a lot of effort was invested to make it as broad and professional as possible. The lectures were great and it gave us a greater glimpse of microencapsulation field which is extremely helpful.”

Lycored

“A good overview of basic science involved in the microencapsulation field to better understand and design these complex systems”

Givaudan

View the full programme online at www.engineering.leeds.ac.uk/short-courses

Further information

Venue

The course venue is 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.

On or before 20 May 2019	£940
After 20 May 2019	£990

A certificate of attendance will be provided on completion of the course.

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. The dress code will be 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 (via debit/credit card). 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.

Our privacy notice tells you what to expect us to do with your personal information when you make contact with us or use one of our services: <https://tinyurl.com/CPD-Privacy-Notice>

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

Katie Warner
CPD Conference and Events Coordinator
CPD, Conference & Events Unit
School of Chemical and Process Engineering Room 3.11
University of Leeds
Leeds, LS2 9JT, UK
T: +44 (0)113 343 8104
E: cpd@engineering.leeds.ac.uk
W: www.engineering.leeds.ac.uk/short-courses/
TW: @LeedsUniCPD
LI: [CPD, Conference and Events Unit, University of Leeds](#)

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.

The CPD Unit take your privacy seriously and we will only use your information to provide information on our CPD courses and relevant engineering events. We will not pass your details to any other organisations. If you have opted in to receive details of future CPD courses from us you can unsubscribe at any time by emailing us cpd@engineering.leeds.ac.uk and your details will be removed from our database.