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 4 June 2018	**£925**
After 4 June 2018	**£975**

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 Monday 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.

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

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 2494
E: cpd@engineering.leeds.ac.uk
W: www.engineering.leeds.ac.uk/short-courses/
@LeedsUniCPD
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.

Faculty of Engineering

UNIVERSITY OF LEEDS

Microencapsulation

Monday 2 – Wednesday 4 July 2018

EARLY REGISTRATION IS RECOMMENDED
2017 COURSE WAS FULLY BOOKED

Microencapsulation

Monday 2 – Wednesday 4 July 2018

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.

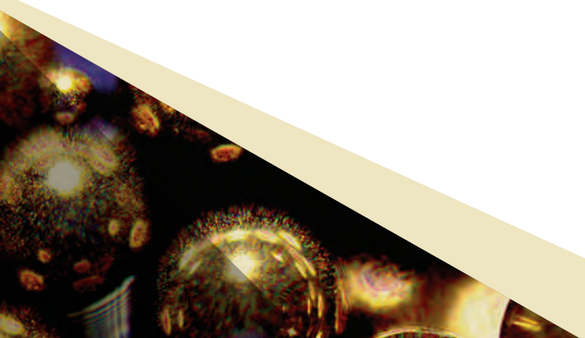
Dr Olivier Cayre, University of Leeds
Olivier Cayre has over 16 years experience in colloid and particle science. He obtained his PhD from the colloid and surfactant group at the University of Hull and worked in the same areas both at North Carolina State University (US) and at the School of Chemical and Process Engineering at the University of Leeds, where he is now an associate professor.

Dr Cayre is the author of over 40 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.

100% of 2017 respondents said the course met their aims and that they would recommend the course to their colleagues

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



Monday 2 July

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 microcapsules (type, shape, size, release characteristics, strength)**
Dr Olivier Cayre
University of Leeds
11.00 Coffee
11.20 **Important properties of system to encapsulate (Hansen solubility parameter)**
Professor Steven Abbott
TCNF & University of Leeds
12.00 **How to decide on an affordable microencapsulation method – economics behind encapsulation**
Professor David York
University of Leeds
12:40 Lunch

Spray drying

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 and Amin Farschi, University of Leeds
Evidencing release from alginate-based microcapsules
Nicolai Suter, Nisco Engineering AG
Metal shell capsules preparation – achieving retention and triggered release of small volatile actives
James Hitchcock,
University of Leeds
Manufacturing monodisperse droplet templates via membrane emulsification
Soyeb Manga, University of Leeds
15.35 Tea
15.55 **Structure of liquid/importance of fluid properties**
Professor Andrew Bayly
University of Leeds
16.35 **Industry Presentation – gel encapsulation, advantages and limitations**
Nicolai Suter, Nisco Engineering AG
17.15 End of day one
19.00 Course dinner

Tuesday 3 July

Coating of particles

09.00 **Coating of solid particles**
Professor Nik Kapur
University of Leeds
09.40 **Process – fluid bed coaters, pan coaters**
Professor David York
University of Leeds
10.30 Coffee
10.50 **Industry presentation on coating of solid particles using fluid beds**
Dr. Stephan Sternowsky
Neuhaus Neotec

Emulsion-based methods

11.30 **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
12.00 Lunch
13.00 **Emulsion theory, importance of miscibility/cLogP, how useful is HLB of surfactants, Pickering emulsions/colloidosomes**
Professor Brent Murray
University of Leeds
13.40 **Demonstration session 2**
Spray drying
Professor David York and Amin Farschi, University of Leeds
Evidencing release from alginate-based microcapsules
Nicolai Suter, Nisco Engineering AG
Metal shell capsules preparation – achieving retention and triggered release of small volatile actives
James Hitchcock,
University of Leeds
Manufacturing monodisperse droplet templates via membrane emulsification
Soyeb Manga, University of Leeds
14.55 Tea
15.15 **Droplet size control theory, importance of surface energy, viscosity and size of molecules**
Professor Malcolm Povey
University of Leeds
15.55 **Industry presentation – Application of emulsion based methods**
Speaker to be confirmed
16.35 Poster/wine reception followed by end of day two

Wednesday 4 July

Emulsion-based methods

Turning emulsions into core-shell microcapsules

09.00 **Forming barriers on droplet and particle surfaces**
Dr Olivier Cayre
University of Leeds
09.40 **Interfacial polymerisation: traditional vs potential of living radical polymerisation methods**
Soyeb Manga,
University of Leeds
10.20 Coffee
10.40 **Colloidosomes: from Pickering emulsions to particle-shell microcapsules**
Dr Kate Thompson
University of Manchester
11.40 **Self-assembly leading to the formation of particles encapsulating certain actives**
Michael Rappolt, University of Leeds
12.20 Lunch
13.20 **From oil droplets to self-assemblies for creating new food functionalities**
Laurent Sagalowicz, Nestlé
14.00 **Key properties and evaluation I**
Nicole Hondow, University of Leeds
14.30 **Key properties and evaluation II**
James Hitchcock,
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 Tea
15.55 Optional lab tour
16.45 End of day three and course

What our previous delegates say:

"For someone just starting in the field of micro encapsulation, this course provides a detailed overview of the methods, applications and mechanisms."
Innocore Pharmaceuticals

"Excellent understanding of industry needs, and, as such, excellent balance between academic innovation and industry progression."
Bayer CropScience R&D Formulation Technology