

Faculty of Engineering
and Physical Sciences



UNIVERSITY OF LEEDS

Crystallisation Science and Engineering

Tuesday 1 – Thursday 3 April 2025

FOR FULL
COURSE DETAILS OR
TO REGISTER VISIT THE
COURSE WEBSITE AT:



100% of 2024
respondents rated
the course as excellent
or good.



Crystallisation Science and Engineering

Tuesday 1 – Thursday 3 April 2025

About the course

Join us for a transformative three-day short course exploring the science and engineering of crystallisation processes. The 2025 programme emphasises digital transformation and integrates experimental and computational workflows.

Participants will engage in hands on laboratory sessions that illustrate crystallisation processes, the application of advanced process analytical technologies (PATs), and particle characterisation techniques. Additionally, delegates will have the opportunity to utilise crystallisation modelling software.

The course will be led by renowned academic and industrial experts in the field and will include insightful case studies.

Course aims

Delegates will leave the course with:

- A solid understanding of crystallisation science and technology to enhance process development.
- Practical skills applicable to the scale-up of manufacturing crystals with desired properties.
- Essential tools and a knowledge framework for effectively supporting company project teams.
- Strategies for engaging with experts and improving collaboration on crystallisation-related projects.

Who should attend

This course is designed for engineers and scientists in industries such as agrochemicals, biotechnology, food, fuels, personal care, pharmaceuticals, and specialty chemicals. It is particularly relevant for those involved in crystallisation process development, scale-up, control, and operations. Additionally, it will appeal to post-graduates and post-docs engaged in research on solid form selection, particle design, and crystallisation.

Course Directors

Dr Tariq Mahmud is an Associate Professor in Chemical Engineering. His expertise lies in industrial crystallisation process development, scale up and control. He also has extensive expertise in integrated CFD-process modelling encompassing development and validation of process models coupled with CFD of turbulent and multi-phase flow systems and nano-/micro-size particulate synthesis processes via crystallisation, reactive precipitation and spray drying. He has led a number of experimental and modelling projects in these areas, as Principal – or Co-investigator, funded by the UK EPSRC, Innovate UK and industry including AstraZeneca, GSK, Pfizer, P&G, NNL and Syngenta. Tariq is currently a committee member of the British Association for Crystal Growth (BACG) and a Council member of the European Network for Crystal Growth.



Dr Xiaojun Lai is a Lecturer in Chemical Engineering and has research interests in the application of process-related analytical and characterisation techniques to studies of crystallisation and precipitation processes. He has used reaction calorimetry for studying process thermodynamics, Raman technique for multiple component crystallisation system characterisation, and in situ XRD for phase transformation investigation. He has also recently developed instrumentation of laser interferometry for visualising crystal growth interface and mass transfer in the boundary layer, and combined X-ray topography and multiple diffraction to characterise crystal defects and made significant use of SR techniques, for in situ probing of crystal structure during practical processing and X-ray spectroscopy for probing impurity impact on crystal growth.



Programme

Tuesday 1 April 2025

08:45 Registration and coffee

09:15 Introduction

Crystallisation Fundamentals

09:25 Crystallisation route map
Professor Kevin Roberts,
School of Chemical and Process
Engineering, University of Leeds

10:35 Coffee

10:50 Supersaturation generation, Nucleation and crystal growth
Dr Antonia Borissova,
School of Chemical and Process
Engineering, University of Leeds

11:50 Fundamentals of polymorphism
Professor Sven Schroeder,
School of Chemical and Process
Engineering, University of Leeds

12:40 Lunch

13:25 Laboratory Demonstrations

Nucleation kinetics

Sarah Thompson,
Technobis, Netherlands and
Dr Tariq Mahmud, School
of Chemical and Process
Engineering, University of Leeds

Growth kinetics

Gabriele Sumanskaite,
University of Leeds

14:45 Tea

15:00 Screening for polymorphs
Dr Bob Docherty,
Visiting Professor University
of Leeds. Consultant – retired
from industry after 32 years

15:45 Solid-state analysis for the characterisation of polymorphs and hydrates
Dr Bob Docherty,
Visiting Professor
University of Leeds

16:30 Fundamentals of co-crystallisation and case studies of recent developments
Professor Mingzhong Li,
De Montfort University,
Professor Anant Paradkar,
University of Bradford

17:15 End of day one

19:00 Course dinner

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.

Wednesday 2 April 2025

08:45 Coffee

Crystallisation Process Engineering

09:00 Hydrodynamics, mixing and heat transfer in batch crystallisers
Dr Tariq Mahmud,
University of Leeds

09:45 Workflow for crystallisation process development – a case study
Dr John Hone,
Syngenta

10:45 Coffee

11:00 Continuous crystallisation processes
Christian Melches,
GEA

11:45 Process spectroscopic techniques
John Andrews,
Clairret Scientific

12:30 Lunch

13:10 Laboratory Demonstrations

13:15 Particle characterisation

Particle size measurement

Dr Mozhdeh Mehrabi,
University of Leeds

In situ particle imaging

Dr Markus Honkanen,
Pixact and
Dr Tariq Mahmud,
University of Leeds

Raman spectroscopy

John Andrews,
Clairret Scientific

14:10 Laboratory Demonstrations continued

15:00 Tea

15:15 Post crystallisation unit operations: filtration and drying
Dr Alan Collier,
Syngenta

16:00 Control of crystallisation processes
Dr Tariq Mahmud,
University of Leeds

16:45 End of day two

Thursday 3 April 2025

08:30 Coffee

08:45 Particle size and shape measurements and characterisation (including properties and performance)
Dr Umair Zafar,
Novo Nordisk, Denmark

Crystallisation Modelling and Software Demonstrations

09:45 Integrating computational and experimental crystallisation workflows to enable digital product design
Dr Bob Docherty,
Visiting Professor
University of Leeds

10:30 Coffee

10:45 CFD modelling of crystallisation processes
Dr Tariq Mahmud,
School of Chemical and Process
Engineering, University of Leeds

11:30 Digital design of crystallization processes
Dr Niall Mitchell,
Siemens Industry Software, London

12:15 Lunch

13:00 Panel Discussion and troubleshooting – experimental practices and best digital tools
Chaired by Dr Bob Docherty,
Visiting Professor
University of Leeds

14:00 Transfer to PC Cluster

14:10 Software demonstration 1: VISUAL HABIT and the CSD – enabling solid form and particle design
Andy Maloney,
Cambridge Crystallographic
Data Centre

15:10 Software demonstration 2: Introduction to the crystallization modules of gPROMS FormulatedProducts (Simulation & Global System Analysis)
Dr Niall Mitchell,
Siemens Industry Software, London

16:10 Wrap-up and feedback from delegates
Dr Tariq Mahmud

16:15 End of day three

What our previous delegates say:

“A good overview of the wide range of areas that affect crystallisation processes, with some of the best in the field providing their thoughts and perspectives on unique problems.”

“The course can be really useful to get introduced to different aspects of crystallisation, with significant consideration of the industrial perspective and the possibility of attending enjoyable lab and software demonstrations.”

View the full programme and book your place online at
<https://tinyurl.com/Crystallisation-2025>

Other relevant short courses:
Spray Drying and Atomisation of Formulations
10 – 12 June 2025
Microencapsulation
9 – 11 September 2025

Further information

Course Fees

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

£1150 VAT exempt – Tuesday 1 – Thursday 3 April 2025

Discount available to full time PhD students.

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.

Parking on and around campus is very limited, and we recommend using public transport where possible. The nearest public car park is Woodhouse Lane (LS1 3HQ).

Accommodation

Delegates are responsible for arranging their own accommodation, if required. A list of nearby hotels will be provided with the joining instructions.



Course Dinner

The course dinner, included in the course fee, will take place at a Leeds city centre restaurant on Tuesday evening. The dress code is smart casual.

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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E: cpd@engineering.leeds.ac.uk

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

 [CPD, Conference and Events Unit,
University of Leeds](#)

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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>.

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