

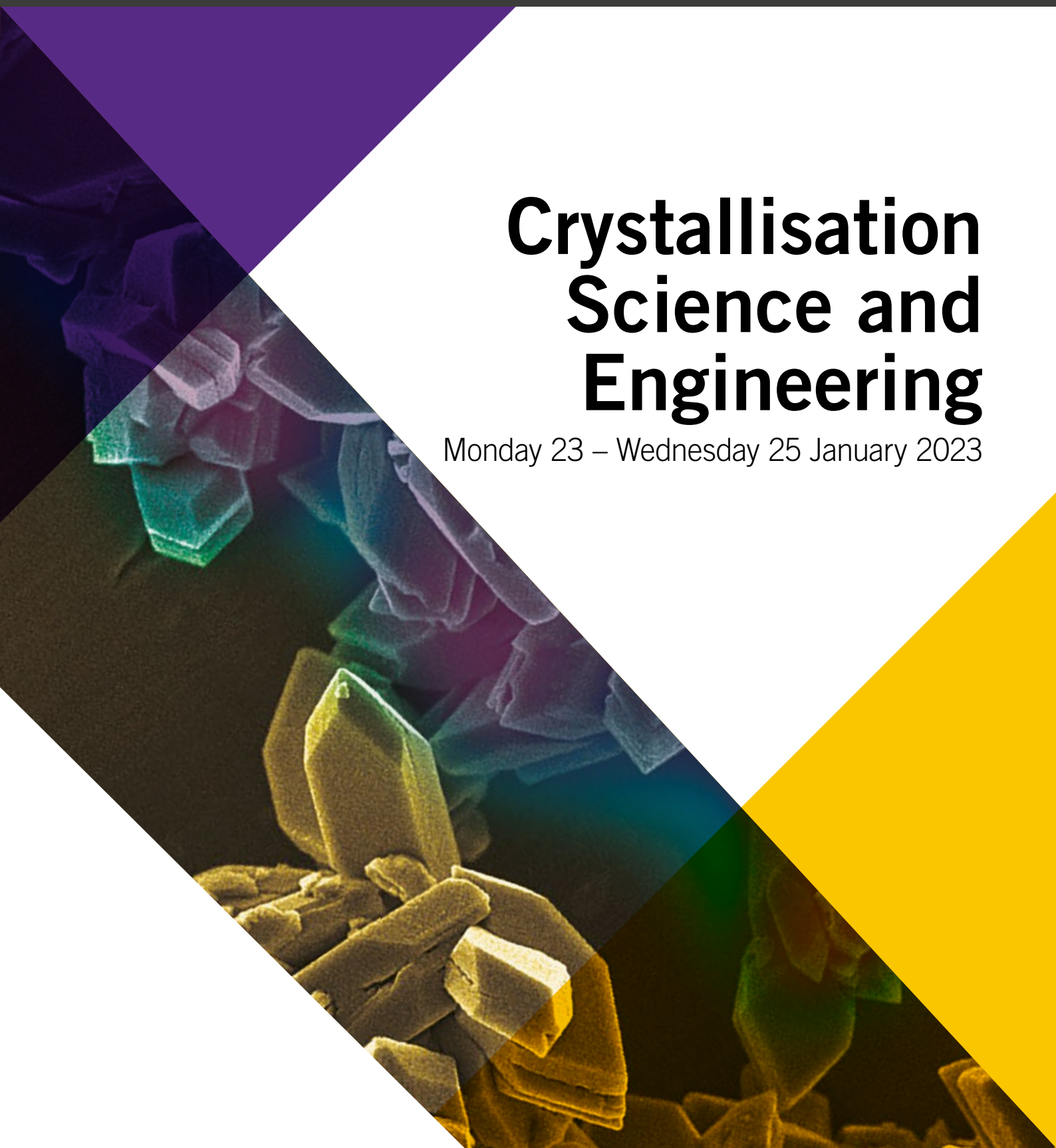
**Faculty of Engineering
and Physical Sciences**



UNIVERSITY OF LEEDS

Crystallisation Science and Engineering

Monday 23 – Wednesday 25 January 2023



Crystallisation Science and Engineering

Monday 23 – Wednesday 25 January 2023, University of Leeds

About the course

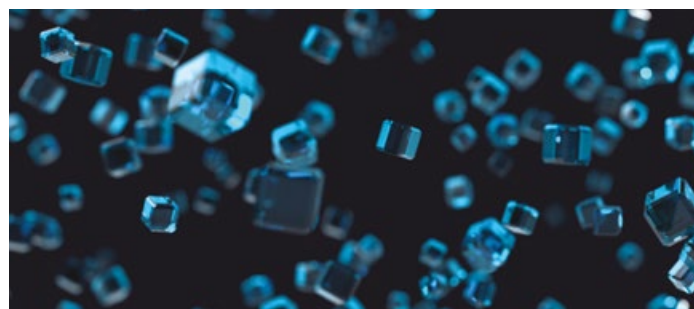
This 3-day short course will outline the fundamental science and engineering of crystallisation processes. The programme embraces digital transformation and weaves together the best experimental and computational workflows. The course will include laboratory experimental sessions to demonstrate crystallisation processes, application of advanced process analytical technologies (PATs) and particle characterisation techniques. The delegates will also have first-hand opportunities to use crystallisation modelling software. The course will be delivered by leading academic and industrial experts in the field and will include case studies.

Course aims

Delegates will leave with core knowledge that they can use in their industrial work and a deeper understanding of crystallisation science and technology to assist in process development and scale-up of the manufacture of crystals for desired properties. The course will also give delegates the tools and a knowledge framework to be able to better support company project teams and engage experts when needed.

Who should attend

This course is aimed at engineers and scientists working in industries such as agrochemicals, biotechnology, food, fuels, personal care, pharmaceutical and speciality chemicals companies. It is relevant to those involved in crystallisation process development, scale-up, control and operations. It will also be of interest to post-graduates and post-docs involved in research in the general areas of 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 member of the British Association for Crystal Growth (BACG) and jointly chaired their 45th and 47th Annual Conference held in July 2014 and June 2016 at Leeds, 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.

What our previous delegates say:

“Very good course, with right balance of speakers from industry and academia, on crystallisation processes and solid-state chemistry.”

“The course is perfect for anyone who wants to learn the fundamentals of crystallisation science and engineering.”

Programme

Monday 23 January 2023

08:45 Registration and coffee

09:10 Introduction

Crystallisation Fundamentals

09:20 Crystallisation route map

Professor Kevin Roberts,
University of Leeds

10:20 Solution properties and super saturation generation

Dr Tom Turner, University of Leeds

11:05 Coffee

11:20 Nucleation and crystal growth

Dr Tom Turner

12:05 Fundamentals of polymorphism

Dr Robert Hammond,
University of Leeds

12:50 Lunch

13:35 Screening for polymorphs (solid form selection)

Dr Bob Docherty, Visiting Professor,
University of Leeds. Recently retired
from Pfizer after 22 years having
previously worked for ICI/Zeneca

14:20 Solid-state analysis for the characterisation of polymorphs and hydrates

Dr Bob Docherty

15:05 Tea

15:20 Fundamentals of co-crystallisation and case studies of recent developments

Professor Mingzhong Li,
De Montford University
Professor Anant Paradkar,
University of Bradford

16:20 Laboratory Demonstrations

D1 – Nucleation kinetics
D2 – Growth kinetics

17:30 End of day one

19:00 Course dinner

Tuesday 24 January 2023

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 Neil George, Syngenta/
University of Leeds

10:45 Coffee

11:00 Continuous crystallisation processes

Christian Melches, GEA,
Duisburg, Germany

11:45 Crystal morphology and habit modification

Dr Hien Nguyen, University of Leeds

12:30 Lunch

13:15 Post crystallisation unit operations: filtration and drying

Dr Amgad Moussa,
Syngenta, Switzerland

Measurements and control

14:10 Process spectroscopic techniques (IR, UV-vis, Raman)

Dr Xiaojun Lai, University of Leeds

14:55 Tea

15:10 Control of crystallisation processes for PSD

Dr Tariq Mahmud,
University of Leeds

15:55 Laboratory Demonstrations
D3 – Particle characterisation
D4 – Raman spectroscopy

17:05 End of day two

Wednesday 25 January 2023

08:45 Coffee

Measurements and control continued

09:00 Particle size and shape measurements and characterisation

Dr Umair Zafar,
Novo Nordisk, Denmark

09:45 Particle properties and performance

Dr Richard Storey,
AstraZeneca, Macclesfield

10:30 Coffee

Crystallisation modelling and software demonstrations

10:45 Digital design: integrating computational and experimental crystallisation workflows to enable product design

Dr Robert Hammond,
University of Leeds

11:30 CFD

Speaker to be confirmed

12:15 Digital design of crystallisation processes

Dr Niall Mitchell, Siemens Process
Systems Enterprise (SPSE), London

13:00 Lunch

13:45 Panel discussion and troubleshooting – experimental practices and best digital tools

14:30 Transfer to PC Cluster/log-in

14:40 Software demonstration: VISUAL HABIT – enabling solid form and particle design

Speaker to be confirmed,
University of Leeds

15:25 Tea

15:40 Software demonstration: Introduction to the crystallisation modules of gPROMS FormulatedProducts (Simulation & Global System Analysis)

Dr Niall Mitchell, SPSE

16:20 Wrap-up and feedback from delegates

Dr Xiaojun Lai and Dr
Tariq Mahmud

16:30 End of day three and course

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 respondents since 2017 have said the course met their aims

Further information

Course Fees

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

£1075 – Monday 23 – Wednesday 25 January 2023

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.

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 (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 and delegates are responsible for making their own way to and from the restaurant. 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

Helen Forsyth
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Faculty of Engineering and Physical Sciences
University of Leeds


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E: cpd@engineering.leeds.ac.uk

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

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

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 and your details will be removed from our database.



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