

EFCE SpotLight Talks

by the Working Parties
and Sections

from
24 May
to
5 June
2023

8 Webinars



EFCE

European Federation of Chemical Engineering

Welcome to the 5th SPOTLIGHT TALKS SERIES!

Entering the third year of EFCE Spotlight Talks highlights these as one of the most significant and visible activities of the EFCE Working Parties and Sections. These talks are now seen by the community of practicing (bio)chemical and process engineers as an important means for sharing and disseminating the latest knowledge in chemical engineering science. Given that in September 2023 we will have an opportunity to meet face to face in Berlin at the ECCE/ECAB conference, this year we are only running the spring series of Spotlight Talks.

This series showcases 8 webinars involving the following Working Parties and the Sections are contributing: Characterization of Particulate Systems, Chemical Engineering as Applied to Medicine, Crystallization, Early Career Chemical Engineers, High Pressure Technology, Multiphase Fluid Flow, Quality by Design, Static Electricity in Industry, Thermodynamics and Transport Properties.

Whatever your area of interest, you are sure to find interesting information on the latest chemical engineering science innovations. Many thanks to all presenters and we hope you'll all enjoy the webinars.

24 May • 14:00

Successful implementation of quality by design along the product life cycle - industrial use cases

25 May • 14:00

The adventurous journey of a reacting species on its ride through a multiphase reactor - new insights with Lagrangian analysis

26 May • 14:00

Technology to improve conventional chemical engineering processes

30 May • 14:00

Chemical engineering as applied to medicine: current challenges and opportunities

31 May • 09:00

Static electricity in industry: flexible intermediate bulk containers, comfort and smart materials

31 May • 14:00

Opening chemical engineering to the power of open science

1st June • 09:00

Innovative characterization techniques for particulate and crystallization processes

5 June • 15:00

A view on the future of applied thermodynamics

CEST

EFCE SpotLight Talks

Working Party on
Quality by Design

24 May
2023

14:00 • 15:30

CEST

SUCCESSFUL IMPLEMENTATION OF QUALITY BY DESIGN ALONG THE PRODUCT LIFE CYCLE – INDUSTRIAL USE CASES



EFCE

Quality by Design (QbD) is a powerful method to gather and deploy process understanding. This spotlight talk focusses on showing industrial used cases. Once, in manufacturing soft sensors capture process understanding for real-time process monitoring of biological processes. On the other side an end-to-end digital twin is successfully used to save 50% of experimental effort in the process design phase. This webinar of the Working Party on Quality by Design therewith demonstrates that Quality by Design can be deployed along the complete product life cycle.

PROGRAM

- 14:00 **Welcome and introduction**
Prof. Ch. Herwig, Chair Working Party on Quality by Design, Technical Univ., Wien - Austria
Giorgio Veronesi, EFCE President
- 14:10 **Real-time monitoring and yield soft sensing in the manufacturing of monoclonal antibodies: an industrial case study**
Dr. Gabriele Bano, Process Analytics Drug Product Development GSK, Collegeville, PA - USA
- 14:40 **Holistic design of experiments – an accelerated pathway to process understanding**
Dr. Thomas Zahel, PAS-X Savvy Körber Pharma Software, Vienna - Austria
- 15:10 **Discussion and conclusion**
Prof. Ch. Herwig, Chair Working Party on Quality by Design, Technical Univ., Wien - Austria

[Registration](#)

free of charge but mandatory

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EFCE SpotLight Talks

Working Party on Multiphase
Fluid Flow

25 May
2023

14:00 • 16:30

CEST

THE ADVENTUROUS JOURNEY OF A REACTING SPECIES ON ITS RIDE THROUGH A MULTIPHASE REACTOR – NEW INSIGHTS WITH LAGRANGIAN ANALYSIS



For the design and operation of multiphase reactors, data averaged over time and space are usually used, which provide statistical information on residence time distributions, dispersion coefficients or energy dissipation rates. From the perspective of a reacting species element, such as a gas bubble, a catalytic particle, or a cell, its Lagrangian trajectory and experienced conditions on its journey through the reactor are more important. Inhomogeneities in temperature, concentrations or shear stresses and the duration of exposure of reacting species elements along their trajectories to these conditions are not captured by current approaches. Especially, because often only the mean velocity fields are derived and considered as a representative dynamical system. New experimental methods with Lagrangian Sensor Particles and 4D Particle Tracking Velocimetry as well as new analytical methods using Lagrangian Coherent Structure Analysis generate new opportunities to follow reactive species in multiphase reactors on their individual paths. We are confident, that these new methods which will be discussed with limits and opportunities in our Spotlight Talk will initiate a paradigm shift in the characterisation of multiphase flows.

PROGRAM

- 14:00 **Welcome and introduction**
Prof. Michael Schlüter - Chair WP on Multiphase Fluid Flow, Hamburg Univ. Tech. – Germany
Prof. Alexandra von Kameke, HAW Hamburg - Germany
Prof. David Bogle, Former EFCE Scientific Vice-President
- 14:10 **Recent developments in LCS Analysis - Diffusive and active transport barrier detection**
Prof. George Haller, Institute of Mechanical Systems, ETH Zürich – Switzerland
- 14:40 **Can we live Danckwerts dream? - PTV-Experiments and LCS Analysis**
Prof. Alexandra von Kameke, University of Applied Sciences, Hamburg – Germany
- 15:10 *Break*
- 15:20 **Are inertial bubbly flows confined in planar thin-gap cells possible innovative bubbly reactors? What we have learnt about Agitation, Mixing and Mass transfer using PIV, PLIF and Shake-The-Box techniques**
Prof. Véronique Roig, Patricia Ern and Sébastien Cazin, Inst. Meca. Fluides, Toulouse - France
- 15:50 **Streamline analyses of CFD simulations to evaluate the process performance of stirred tank reactors**
Dr. Arne Hoffmann, Dr. Sebastian Meinicke, BASF SE, Ludwigshafen - Germany
- 16:20 **Discussion: Paradigm shift in the characterisation of multiphase flows**
Conclusion

[Registration](#)

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EFCE SpotLight Talks

Working Party on
High Pressure Technology

26 May
2023

14:00 • 17:30

CEST

TECHNOLOGY TO IMPROVE CONVENTIONAL CHEMICAL ENGINEERING PROCESSES – Part II



Chemical engineering can provide the answers to the major challenges in developing sustainable processes. Pressure is a variable that allows the intensification of processes with compact equipment and solvent and reaction media properties, improving yield and selectivity and excluding effluent generation. Water and CO₂ are widely recognized as green solvents, whereby the pressure can provide enhanced solvent and transport properties for CO₂ or transform water into a non-polar solvent. The constant improvement of high-pressure technologies enables the goal of creating energy-efficient and environmentally friendly processes. This webinar will discuss the role of a chemical engineer in the modern world and present high-pressure technologies that significantly improve the conventional processes used in the chemical, food, and pharma sectors and materials engineering. As a result, they provide enhanced safety and quality of solvent-free products, which go beyond the requirements of more restrictive future legislation.

PROGRAM

- 14:00 **Welcome and introduction**
Prof. Irena Zizovic, Wroclaw University of Science and Technology - Poland
Prof. Jarka Glassey, EFCE Executive Vice-President
- 14:10 **The role of the chemical engineer during the energy transition and development of a circular economy**
Prof. Philip Jaeger, Clausthal University of Technology - Germany
- 14:40 **Sustainable and efficient processing under high pressure**
Dr. Jasna Ivanovic & Dr. Judith Kremer, Uhde High Pressure Technologies GmbH - Germany
- 15:10 **Scale up of supercritical fluid technology. Example of new continuous process industrialization**
Dr. Jean-Yves Clavier, Supercritical Fluid Technology and Engineering - France
- 15:40 **Engineering of porous materials from microscale to application**
Prof. Pavel Gurikov, Hamburg University of Technology - Germany
- 16:10 **Natural antioxidant powder gained by supercritical fluids**
Prof. Sabine Grüner-Lempart, Univ. Applied Sciences Weihenstephan-Triesdorf – Germany
- 16:40 **Applications of SCF in textiles wet processing**
Prof. Tarek Abou Elmaaty, Damietta University - Egypt
- 17:10 **Conclusion**
Prof. Irena Zizovic, Wroclaw University of Science and Technology - Poland

[Registration](#)

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EFCE SpotLight Talks

Section on Chemical
Engineering as Applied
to Medicine

30 May
2023

14:00 • 16:15

CEST

CHEMICAL ENGINEERING AS APPLIED TO MEDICINE: CURRENT CHALLENGES AND OPPORTUNITIES



The program of the Spotlight Talks of the new scientific Section of the EFCE will demonstrate how current approaches and toolkits used in Chemical Engineering can be applied to selected problems of physiology and medicine. Four talks will cover the modelling and systems engineering techniques showing their use to tackle the complexity of physiology and pharmacology. This event includes transport and reaction engineering being used to model biological systems across multiple levels for the development of new therapeutic strategies and pharmacological solutions.

PROGRAM

- 14:00 **Welcome and introduction**
Prof. Tomasz R. Sosnowski, Chair Section on Chemical Engineering as Applied to Medicine
Warsaw University of Technology - Poland
Prof. David Bogle, Former EFCE Scientific Vice-President
- 14:10 **Metabolic clearance of uremic toxins in the artificial kidney**
Prof. Maria Norberta de Pinho, Instituto Superior Técnico, University of Lisbon - Portugal
- 14:40 **Chemical engineering approach for new cancer treatments**
Prof. Eva Maria Martin Valle, University of Salamanca - Spain
- 15:10 **Quantitative Systems Pharmacology**
Dr. Roberto Abbiati, Boehringer Ingelheim - Germany
- 15:40 **Chemical engineering as a toolkit for precision crystallization, spherical agglomeration and formulation of pharmaceuticals**
Prof. Brahim Benyahia, Loughborough University - UK
- 16:10 **Conclusion**
Prof. Tomasz R. Sosnowski, Warsaw University of Technology - Poland

[Registration](#)

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EFCE SpotLight Talks

Working Party on
Static Electricity
in Industry

31 May
2023

09:00 • 11:00

CEST

STATIC ELECTRICITY IN INDUSTRY: FLEXIBLE INTERMEDIATE BULK CONTAINERS, COMFORT AND SMART MATERIALS



Static Electricity is mainly a mystery in many industrial processes. Its effects may be dangerous, unpleasant or useful. In this Webinar we will travel from risks to applications of static electricity. Electrostatics risks are of several kinds in industry. We will focus on risk coming from handling of powders or materials in flexible intermediate bulk containers (FIBC). This is a very common situation in the process industry and standards and some precautions have to be taken into account to avoid accidents. Dr. Paul Holdstock will give a talk about FIBC, safety measures and standards. There exist many solutions to rule out accidents from any process. Then, in a less severe scale far from accidents, we can find unpleasant situations related to comfort. We are talking about electrostatic discharges that do not represent a threat to safety or health but a permanent discomfort in houses or offices. Dr. Pedro Llovera-Segovia will make a presentation about this relatively new concept of Electrostatic Comfort in houses or offices. Finally, to finish with a positive view on electrostatics, Dr. Gustavo Ortega-Braña will present a piezoelectric material based on the accumulation of electrostatic charges. With the methods presented by Dr. Gustavo Ortega-Braña, it will be possible to convert a polypropylene film, a non piezoelectric material, into a flexible, light and cheap piezoelectric material.

PROGRAM

- 09:00 **Welcome and introduction**
Dr. Pedro Llovera-Segovia – Chair Wprking Party on Static Electricity in Industry
Prof. Jarka Glassey, EFCE Executive Vice-President
- 09:10 **FIBC, standards and rules for a safe handling of materials**
Paul Holdstock, Holdstock Technical Services, Manchester - United Kingdom
- 09:40 **Electrostatics comfort in buildings and offices**
Dr. Pedro Llovera-Segovia, Energy Techn. Institute, Polytechnic Univ. of Valencia - Spain
- 10:10 **Piezoelectric materials obtained from polypropylene foams**
Dr. Gustavo Ortega-Braña, Aplicaciones Tecnológicas SA, Valencia - Spain
- 10:40 **Discussion and conclusion**
Dr. Pedro Llovera-Segovia - Chair WP on Static Electricity in Industry

[Registration](#)

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EFCE SpotLight Talks

Section on
Early Career Chemical
Engineers

31 May
2023

14:00 • 16:45

CEST

OPENING CHEMICAL ENGINEERING TO THE POWER OF OPEN SCIENCE



Open science has proven itself, from the discovery of far galaxies to human genome. Now that it is becoming widespread, will the open knowledge out there also revolutionize chemical engineering? This spotlight talk series aims giving an overview of open science today and its ramifications into chemical engineering. How open data and software can lead to step changes in both academic and industrial contexts is illustrated via concrete applications.

PROGRAM

- 14:00 **Welcome and introduction**
Gabriele Verrecchia, Chair Section on Early Career Chemical Engineers - Italy
Giorgio Veronesi, EFCE President
- 14:10 **Open science today**
Pedro Mendes, University of Lisbon – Portugal
- 14:25 **Data integrity, accessibility, and data management in physical chemistry**
Simon Stephan, TUK - Technical University of Kaiserslautern – Germany
- 14:55 **Enabling a data-driven future for Synthetic Organic Chemistry with Open Data**
Teodoro Laino, IBM, Zurich - Switzerland
- 15:25 **Data-driven optimization in process engineering**
Antonio del Rio, Imperial College London – United Kingdom
- 15:55 **Introduction to Cape-Open on behalf of CoLAN.org**
Richard Baur, Shell, CAPE-OPEN, The Netherlands
- 16:25 **Conclusion**
Pedro Mendes, University of Lisbon - Portugal
Laura Pirro, Yara International - The Netherlands

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EFCE SpotLight Talks

Working Parties on Crystallization and Characterization of Particulate Systems

1st June
2023

09:00 • 12:00

CEST

INNOVATIVE CHARACTERIZATION TECHNIQUES FOR PARTICULATE AND CRYSTALLIZATION PROCESSES



In this webinar we will explore recent advancements in the field of characterization techniques for particulate and crystallization processes. Several techniques will be discussed including micro-computer tomography, in-line image analysis, as well as light-scattering. The practical implications of these advancements on the possibility of in-line monitoring and process control will also be discussed.

PROGRAM

- 09:00 **Welcome and introduction**
Martin Morgeneyer, Chair Working Party on Characterization of Particulate Systems
Daniele Marchisio, Chair Working Party on Crystallization
Jarka Glassey, EFCE Executive Vice-President
- 09:10 **Micro-computed tomography for 3D particle characterization**
Simon Schiele, TU/Munchen - Germany
- 09:25 **Challenges and possibilities of using inline image analysis for real time monitoring of the particle size and morphology in industrial crystallization examples**
Sebastian Maass, Sopat GmbH, Berlin - Germany
- 09:40 **A crystal engineering approach for rational design of novel sustainable food, agrochemical and pharmaceutical formulations**
Elena Simone, Politecnico di Torino - Italy
- 09:55 **Toward an accurate characterization of size and shape of crystalline powders: challenges and how we tackled them**
Ashwin kumar Rajagopalan, Univ. of Manchester - United Kingdom
- 10:10 **Laser-induced cavitation for controlling crystallization from solution**
Eral Burak, Technical Univ. Delft – The Netherlands
- 10:25 **Crystallisation using fluidic devices without moving parts**
Vidit Tiwari, University of Limerick - Ireland
- 10:40 **Online monitoring from the nanoscale into the micron area**
Stephen Ward-Smith, Malvern Analyticals - United Kingdom
- 10:55 **Monitoring an amorphous-phase mediated crystallization using process analytical technologies**
Isabella Jul-Jørgensen, Novo Nordisk A/S - Denmark
- 11:10 **Discussion and conclusion**

[**Registration**](#)

free of charge but mandatory

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EFCE SpotLight Talks

Working Party on Thermodynamics and Transport Properties

5 June
2023

15:00 • 17:00

CEST

A VIEW ON THE FUTURE OF APPLIED THERMODYNAMICS



The Working Party has published an [opinion paper](#) that discusses the challenges that the field of applied thermodynamics is facing in responding to the United Nations [Sustainable Development Goals](#). This webinar aims at sharing with the community the priorities that we believe are important, both at the technical level (modelling and data) and at the non-technical level (education and development of collaborative projects). An open discussion with all panellists will aim to identify and promote new initiatives.

PROGRAM

- 15:00 **Welcome and introduction**
Prof. Maria-Grazia de Angelis, Chair Working party on Thermodynamics, U. Edinburgh - UK
Giorgio Veronesi, EFCE President
- 15:10 **Grand challenges of modern society, a pertinent role for applied thermodynamics**
Dr. Antoon ten Kate, Principal Scientist at Nouryon – The Netherlands
Modern society faces a multitude of grand challenges that need to be addressed appropriately and urgently. Hence, world-wide there is substantive attention paid to resolving thematic issues related to water, energy, climate and so on. As thermodynamics is the science of interaction between energy and matter, it is very well positioned to develop and judge the appropriate and timely action.
- 15:30 **Modeling and Simulation: tools and needs**
Richard Elliott, Professor Emeritus at the University of Akron - USA
Fundamental methods are beginning to supersede traditional methods in accuracy by factors of 3-5 for important properties like vapor pressure and formation energies. These trends will continue, encompassing properties that are essential to addressing issues like carbon capture, safe groundwater, and pharmaceutical production, to name a few.
- 15:50 **Data Challenges: Availability, Discoverability, Reporting, Quality**
Dr. Ala Bazyleva, Research Chemist at NIST - USA
When data users need experimental property data, they face a number of challenges: whether the required data exist, where/how to find the existing data, whether the found existing data useable (properly reported), and whether the obtained data are reliable. The situation, including identification of problems and potential solutions, will be briefly analyzed based on the author's experience.
- 16:10 **Education, training, networking: the "soft skills" needed to go forward**
Prof. Jean-Charles de Hemptinne, Research engineer at IFP Energies Nouvelles - France
Technical progress is not only a technical task. Many different stakeholders must be motivated to move in a common direction. Education is key for success, but this comes through many different channels, starting from general public all the way to decision-makers.
- 16:30 **Discussion and conclusion**

[Registration](#)

free of charge but mandatory

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