Highlights

17.02.2025

The Forge 2024
& Prize Winners
How to enhance PAT
In-Situ Nanoparticle
Characterisation

Newsletter 6 (PCIG N6)

Welcome to the sixth edition of our newsletter!

Join Us in Advancing Scientific Research

RSC INTEREST GROUP
PARTICLE
CHARACTERISATION

Newsletter 6 (PCIG N6) - 17.02.2025

PREFACE

This newsletter aims to serve as a means of internal communication of useful information and strengthen the engagement among the group members. This quarter's newsletter with the first edition (November 2024 – February 2025) consists of three main sections:

A. Research highlights, which represents the emerging technologies in particle characterisation.

B. People focus, which reveals the motivation and sharing from different researcher members.

C. Update corner, which summarises the new events, collaboration, and other opportunities.

Our editorial team includes Mel Disher, Merel Bout, Phil Jackson, Stefanos Mourdikoudis, Sayantan Das and Tien Quach. We would like to express great appreciation to the PCIG Committee for encouraging and advising us to issue the first edition of PCIG Newsletter. Many thanks for the contribution from the people who are willing to co-operate with us. We look forward to your collaboration in the next editions!

Welcome to the PCIG Newsletter,
where we network and work together for better particle technologies.

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Inhound

A. RESEARCH HIGHLIGHTS

A1. Solutions to enhance process analytical technology offerings in the field of powder processing

Written by Phil Jackson

Process Analytical Technology (PAT) is a term used to describe systems that provide better understanding (leading to control) of production processes by monitoring critical properties in real time. For powder processing, Near Infra-Red (NIR) and Raman probes are two important in-line characterisation techniques.

When monitoring powders during processing, three significant challenges arise. Firstly, probes can become fouled due to powders gradually adhering to and accumulating on the probe surface. Secondly, the amount of material that contributes to a single scan of a stationary powder is small, around 3 mg, so the powder may need to be scanned repeatedly while refreshing the powder to obtain a representative sample. Thirdly, in scenarios where powder particles are tumbling past a probe, there is often an insufficient concentration of powder to secure reliable readings.
PCIG committee member Phil Jackson was recently made aware of solutions to the aforementioned challenges during a meeting with Manuel Kuhs, sales manager at Expo Process Analytics.

Manuel Kuhs from Expo Process Analytics

To counter the first issue cited above, the company offers a steel housing for probes that holds the probe in such a way as to be easily inserted into a process via a standard hygiene fitting. To overcome the fact the probe window may become fouled, the window has a PTFE wiper that periodically removes accumulated powder to provide a clear view for the next measurement (see figure 1). The housing can also be heated to assist cleaning.

Figure 1 : Probe Housing with Sapphire Window and PTFE Wiper Blade

In terms of addressing the issue of having insufficient sample amount, Expo Process Analytics offers two solutions. Firstly, a recessed ledge can be attached in front of the window. This allows falling powder to quickly accumulate to provide the necessary concentration for measurement (see figure 2).

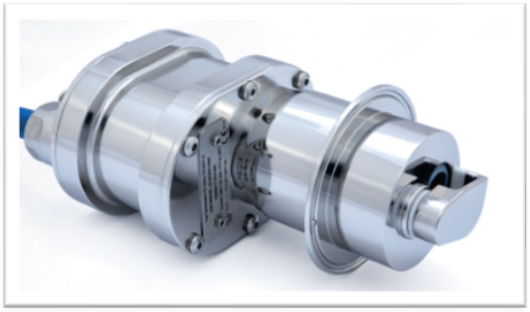

Figure 2: Powder Collection Ledge Attached in front of the Probe Housing Window

Secondly a spider wheel can be attached in front of the window (see figure 3). It will be appreciated that an anti-clockwise motion of the wheel allows falling powder to:

- Accumulate in a zone as it achieves the 12 o'clock position (see zone 1 in figure 3) before …..
- Passing the probe – indicated by a yellow circle - for measurement (zone 2) and finally ……
- Falling back into the powder processing chamber (zone 3).

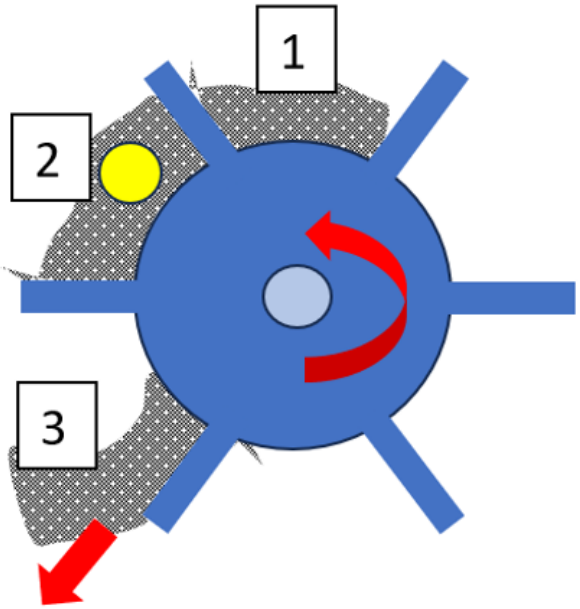

Figure 3: Spider wheel attachment to assist real-time presentation of powder to probe. Powder collection at top; anti-clockwise rotation to probe (yellow circle); release of powder bottom left

Expo Process Analytics have established a strong foothold in the pharmaceutical market, but are keen to engage with other industrial sectors facing inconsistencies or behavioural drift during powder processing. The probe holders have been proven for a range of powder processing scenarios including:

- Powder Blending
- Bulk Container Discharge
- Spray Dryer Discharge
- Fluids Beds
- Wet Granulation

More information can be found at their website: https://www.expoprocessanalytics.com/

A. RESEARCH HIGHLIGHTS

A2. Directed self assembly and its in-situ characterisation using video microscopy to understand nanoparticle deposition mechanisms

Written by Sayantan Das

The figure to the right shows stains produced by the evaporation of coffee [1] .The coffee ring effect, a phenomenon where primarily ground coffee particles migrate to the periphery, forming a ring-like deposit, was one of the first insights into the world of nanoparticles and its deposition patterns that is from a day to day life perspective.

Primarily by using in-situ characterization: it was found that this effect is primarily driven by capillary flow resulting from differential evaporation rates across the droplet's surface, leading to particle accumulation at the edges [1], hence to the naked eye a ring of sort has become known as coffee ring. Understanding this effect aided in developing uniform coatings for inkjet printing and surface treatments [2]. It has also benefited the field of Biomedical Diagnostics: concentrating analytes at the edges of droplets using the coffee ring effect enhances assay sensitivity [3].

In materials science, understanding and manipulating the coffee ring effect is crucial for applications requiring uniform coatings, such as in printed electronics and sensor fabrication. Uncontrolled coffee ring formations can lead to inhomogeneous films, adversely affecting applicability. Researchers have developed methods to suppress this effect, including altering particle shapes, introducing surfactants, and employing external forces like acoustic waves to mitigate the coffee ring effect [4,5]. Furthermore, the coffee ring effect serves as a model system for studying self-assembly processes, offering insights into the behavior of colloidal particles and the development of novel materials with tailored properties. By understanding the underlying mechanisms, one can design strategies to control particle deposition, enabling the fabrication of advanced materials with specific functionalities. Few of the drawbacks of current research on creating uniform films : as reported in [4], the acoustic suppression methods require precise control over external parameters, making them less reliable for large variety and/or differing size mixture particles [4]. Further most laboratory scale suppression strategies are not easily scalable, whereas convective self-assembly is more suited for industrial applications [2]. The latter type of self-assembly offers enhanced patterning, control, and scalability, demonstrated in various studies of binary colloidal systems, such as size-segregated patterns [6].

References:

[1] "Coffee ring effect," Wikipedia, [Online]. Available: https://en.wikipedia.org/wiki/Coffee_ring_effect.
[2] "Understanding the coffee ring effect," TU Delft Research Repository, [Online]. Available: https://research.tudelft.nl/files/93598505/1_s2.0_S0001868617303664_main.pdf
[3] S. Okaiyeto, "Applications of the coffee ring effect," ResearchGate, [Online]. Available: https://www.researchgate.net/publication/370843743.
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[5] P. Marinaro et al., "Coffee ring suppression through substrate engineering," Physics of Fluids, vol. 36, no. 11, pp. 113304, 2022.
[6] S. Das et al., "Formation of periodic size-segregated stripe patterns via directed self-assembly of binary colloids," Applied Surface Science, vol. 452, pp. 101–110, 2018

Understanding the mechanisms of self-assembly of particles during the scalable convective deposition processes with varying shapes, sizes, and features is crucial. Post-deposition characterization techniques such as Scanning Electron Microscopy (SEM), Atomic Force Microscopy (AFM), and other thin film optical characterisations provide high-resolution insight into the final assembly. However, these methods are limited to static observations and are often expensive. In contrast, in-situ characterisation offers the advantage of real-time visualization of dynamic processes, enabling a deeper understanding of phenomena such as particle ordering, pattern formation, and defect evolution. These insights are instrumental in optimizing the design of deposition processes and enhancing scalability [2].

Among the various in-situ techniques, video microscopy is a widely adopted tool, due to its simplicity and compatibility with scalable processes. It allows real-time monitoring of particle behavior during deposition. For particles near the resolution limit of standard microscopes, the use of specialized lenses is essential to achieve clear visualization without compromising the scalability of the process. One of the studies on stripe pattern formation in binary colloids [1] has been highlighted in Advances in Engineering Magazine (https://advanceseng.com/scalable-self-assembly-nanoparticles-industrial-applications/ : in that work, you will be able to see a video of the particle assembly using the tools below utilizing a high-objective infinity-corrected lens with a magnification of 50X and a resolution of 500 nm. This setup enabled visualization of the particles of sizes ranging from 600 nm to 900 nm, at a minimum height of 3 mm above the sample. The lens offered additional characteristics such as compatibility with various deposition components, high numerical aperture for enhanced image clarity, flat field correction for uniform focus, and a long working distance suited for meniscus-driven assembly processes without the need for oil immersion.

In this study, video microscopy was instrumental in elucidating the mechanisms behind size-based segregation and periodic stripe pattern formation during the convective self-assembly of binary colloids. It demonstrated that parameters such as particle size ratio, volume fraction, blade speed, substrate properties, and solvent surface tension significantly influenced the uniformity of the patterns. By capturing real-time video of the deposition process, the study provided evidence for the role of meniscus behavior and particle interactions in forming periodic stripes. The use of real -time visualisation supported the development of hypotheses regarding particle assembly and offered insights into the scalability and control of the process [1].The detailed setup and methodologies described by Das et. al.[1] serve as a reference for researchers investigating scalable deposition processes.

In conclusion, in-situ characterization, particularly through video microscopy, is a powerful tool for understanding and controlling nanoparticle self-assembly. The insight gained from video microscopy studies can guide the design of scalable processes and improve the reproducibility of experimental outcomes. This discussion aims to assist researchers in making informed choices about characterisation techniques and encourages the integration of advanced methods for enhanced monitoring and discovery.

References:

[1] S. Das et al., "Formation of periodic size-segregated stripe patterns via directed self-assembly of binary colloids," Applied Surface Science, vol. 452, pp. 101–110, 2018
[2] P. A. Kralchevsky and N. D. Denkov, "Capillary forces and structuring in layers of colloid particles," Current Opinion in Colloid & Interface Science, vol. 6, no. 4, pp. 383–401, 2001.

B. PEOPLE FOCUS

WHY JOIN US?

- We love to understand your technical and social experiences, especially your untold stories throughout the learning and working journey.
- We would like to motivate more students - researchers to follow their passion and careers in particle science.
- We believe a single effort and contribution to help make our world better should be recognised and spread out.

HOW?

If you are interested in participating, please contact us for more details!

B.1 Get to know

We can understand the research interest and career pathways from our PCIG members. We will start with an overview of two of the Committee members, but please contact us to share your background and experience in future newsletters.

Caroline Welch, MSc, AMRSC

Since starting my career at Reading Scientific Services Ltd (RSSL) I have focused on the particle characterisation of food, pharmaceutical and personal care products, gaining experience from analysing products across the wide client base of a leading CRO. This was the perfect introduction to the industrial applications of particle characterisation, as well as opening my eyes to the different traditions and directions within each sector. It has also helped me blend my education in chemistry (Imperial College London) with more applied science.

I now work for Mondelez International, developing and applying a range of particle characterisation (and other) techniques for research, quality control, process control and troubleshooting. All in aid of improving the products and processes within our portfolio of global snack brands.

Having previously attended the Forge event virtually, I took the opportunity to join the committee at the next member vacancy. The PCIG committee is a fantastic group of people which represent an even wider selection of particle characterisation experts and applications. It's a great way for us all to broaden our horizons, share knowledge, and learn from industries outside our own.

Emil Obeid, Ph.D.

Dr. Emil Obeid, an Assistant Professor of Chemistry at the American University of the Middle East in Kuwait, holds a Ph.D. in Catalysis and Physical Chemistry from the University of Claude Bernard Lyon 1, Lyon, France (2010–2013). His diverse research interests encompass Computational Chemistry, Heterogeneous Catalysis, Physicochemical Characterisations of Ceramic Oxide Catalysts, Electrochemistry and Electrocatalysis, Automotive Pollution with an environmental focus, Production of Hydrogen, Numerical Modelling, Atmospheric Reactivity of Volatile Organic Compounds, and Physical Chemistry.

Dr. Emil Obeid brings a wealth of expertise in various research skills, including Computational Chemistry tools such as Gaussian and Molecular Dynamics Simulation, Synthesis of Inorganic Materials, Material Sciences, and an array of Characterisation Techniques (BET, XRD, TEM, SEM, XPS, FT-IR, Mass Spectrometry, TPR, TPO, TPD, etc.). His capabilities extend to Catalytic Application and Setup, Kinetic Studies, Numerical Modelling, and Homogeneous Atmospheric Reactivity using advanced instruments like PTR-ToF-MS, GC-MS, and SMPS.

B.2 Our inspirer: Professor Dr. Herman Vromans

Interviewed by Merel Bout

Prof. Dr. Herman Vromans has over 30 years of experience in pharmaceutical technology ranging from drug formulation, manufacturing processes to biopharmaceutical research. His career spans both industry and academia. Herman has worked at the companies Organon, Tiofarma, has consulted for Eagle Rock Consultants and was Professor of Pharmaceutical Technology at Utrecht University, The Netherlands. Currently, Herman is fulfilling his role as co-founder at VaRi Bioscience as Head of Product Development. In his free time he loves to play the instrumental organ and is a firm believer of having a healthy balance between working and leisure. What makes him unique is his ability to integrate scientific insights with practical solutions, ensuring successful translation of pharmaceutical innovations from concept to production.

Why did you become a scientist? What drew you to this field?

As a student, I already knew I liked to solve complex issues (‘puzzles’). Puzzles can be abstract questions/problems that can only be solved if you ask the right questions or perform the needed research to identify unknown fields or to address unanswered questions (Figure 1). Building on that, the essential question isn’t simply, “How can I measure this?” Instead, the focus should be, “What do I want to uncover by measuring this?”

Figure 1: Solving a puzzle [1]

The specific field in which you solve these puzzles doesn't matter to me, it is all about the puzzling itself. What intrigued me was the process of tackling problems and allowing my sense of curiosity they sparked. That is why I chose Pharmaceutical Sciences because it blends biology, chemistry and physics providing enough opportunities for me to explore.

Could you mention an example?

One of my most rewarding real-world puzzles was conducting research on the excipient lactose. Lactose is a substance derived mainly from cows milk of which the Dutch are number 4 among the largest producers of the world (That explains why we are mostly known around the world for our cheese).

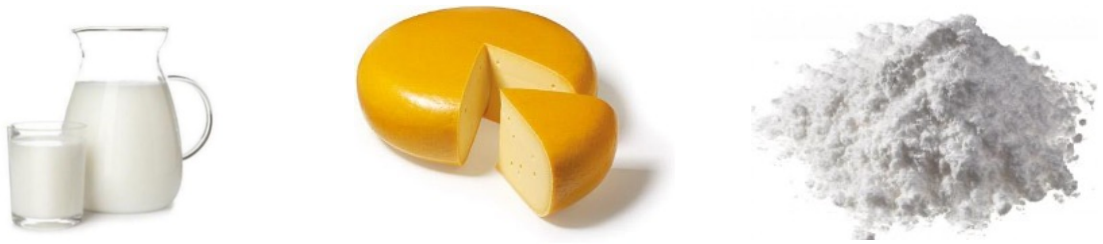


Figure 2: Lactose is extracted from milk, which is a byproduct of cheese production [2,3,4]

At the time, we were trying to apply lactose for direct compression in order to facilitate tablet production. We found that there were differences in the behaviour between lactose grades. Lactose grades are produced through different crystallization methods, which directly influence their properties and suitability for various applications, including tablet production. Environmental factors and impurities can significantly influence crystal formation. Lactose crystals that crystallize in an extremely pure state were found to be unsuitable for tablet production [5-8]. These beautifully formed crystals were no longer able to be deformed, something which is required for direct compression. Suggesting that a little chaos, or amorphization in this case, can actually be a good thing! Another observation we made is that impurities were localised on the surface of lactose crystals where they induced degradation of a drug [9]. That is why I believe it is important to know at which scale you are looking at your issue, from looking at the surface of individual particles up to a collection of particles at a larger scale.

What is your advice for the next generation in your research area?

If we want to continue to innovate and investigate, we need to create an environment that stimulates free thinking. This requires a stage where we can be trying out and looking for things, something called the fuzzy front end. A stage at the beginning of a project where it is allowed to ask different questions and go after different ideas and further down the line, we can set more criteria and boundaries. Such a project led by a project manager also works best if the manager not only encourages independence but also trusts in the abilities of their team members.

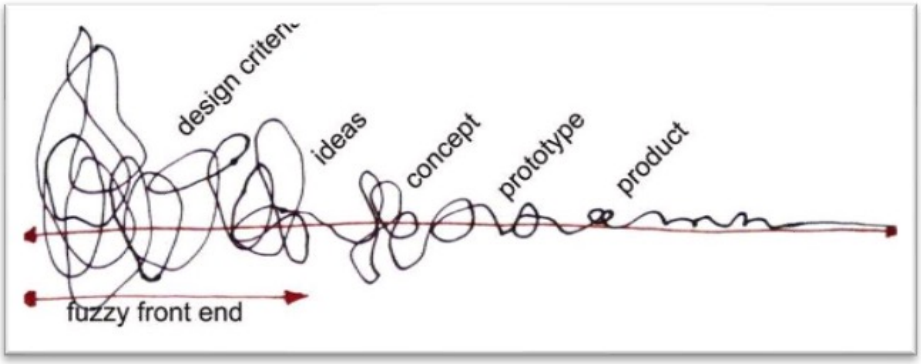
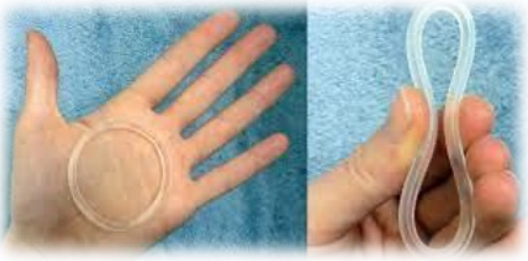


Figure 3: Innovation process (Sanders, Stappers 2008)

In order to be able to learn and know what questions to ask, we are at the best position if we surround ourselves with multiple disciplines. Every field has its own type of background and knowledge which can be beneficial and prevent ways of collective thinking.



With the help of my colleagues at Organon, we were able to create a hormonal anticonception dosage form that was an improved version without occurring side effects induced by (relative) overdosing. The contraceptive vaginal ring named Nuvaring is a flexible vaginal contraceptive ring that releases the hormones etonogestrel and ethinyl estradiol daily to inhibit ovulation. The ring is used for three weeks, followed by a one-week break [10]. As a controlled release system, insurance of a precise and controlled dosing is crucial. Especially since the drug is delivered directly into the bloodstream and bypasses the liver's first-pass metabolism. With our study, we were able to highlight the importance of understanding the basic principles on how hormone release takes place in relation to the diffusion coefficients and solubility values during preformulation [10]. Additionally, we found that the release and solubility of etonogestrel were influenced by the concentration of ethinyl estradiol. The two steroids form an eutectic mixture, reducing their melting points which results in an increase in solubility and hence in altered permeability properties. By obtaining accurate data, an optimal dosage of the hormones could be determined, effectively reducing any side effects [10].

So by starting with the basic principles, allowing yourself to ask questions, and daring to be critical, you will become a great researcher!

References:
[1] Image credit to: https://www.intelligentliving.co/best-jigsaw-puzzle-sites-to-train-your-brain
[2] Image credit to: https://www.culinaide.com/milk.htm
[3] Image credit to: https://www.dutchfoodexpress.nl/product/boerenkaas-classe-royale-500-gram/
[4] Image credit to:https://yeahbrew.co.za/product/lactose-powder-500g/
[5] Vromans H, de Boer AH, Bolhuis GK, Lerk CF, Kussendrager KD. Studies on tabletting properties of lactose, Part I. The effect of initial particle size on binding properties and dehydration characteristics of lactose. Acta Pharm Suec. 1985;22(3):163-72.
[6] Vromans H, de Boer AH, Bolhuis GK, Lerk CF, Kussendrager KD, Bosch H. Studies on tableting properties of lactose. Part 2. Consolidation and compaction of different types of crystalline lactose. Pharm Weekbl Sci. 1985 Oct 25;7(5):186-93.
[7] de Boer AH, Vromans H, Lerk CF, Bolhuis GK, Kussendrager KD, Bosch H. Studies on tableting properties of lactose. Part III. The consolidation behaviour of sieve fractions of crystalline alpha-lactose monohydrate. Pharm Weekbl Sci. 1986 Apr 25;8(2):145-50.
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[10] van Laarhoven JAH, Kruft MAB, Vromans H. In vitro release properties of etonogestrel and ethinyl estradiol from a contraceptive vaginal ring. Int J Pharm. 2002 Jan 31;232(1-2):163-73.

Inspiring stories

Do not hesitate to share your stories to motivate other researchers and students. You can write about the people, the events that motivated you throughout your learning, working and research (either the good or the bad things happened). We look forward to hearing from you.

B.3 A word from our Prize Winners

At the PCIG committee, we deeply value celebrating achievements and recognizing hard work. We believe in honoring dedication and effort, which is why we present awards at our events. Without further ado, here are the winners of The Forge 2024!

For the Best Flash Presentation

Lana Rawlings, University College London

“Receiving this award is a great honour—thank you for the opportunity to share my work! Presenting my research, especially the range of characterisation techniques I’ve been using, to such a great audience was a rewarding experience. I appreciated the insightful questions and enjoyed connecting with others at the conference.”

For the Best MSc Presentation

Sophia Torgal, Aston University

"I am really glad I got this opportunity to present in the FORGE 2024 conference. Which improved my confidence and gave an excellent exposure towards the events and people and researchers.This will have a great impact and will help me in my future growth and opportunities.As a fresher and MSC student this opportunity and the award will surely help me in my career goals. Once again I am really glad and thankful to the Chemistry Research organisation for organising the wonderful events. Wish to attend more in future."

For the IChemE Innovation Award

Sayan Pal, University College London

"I am deeply honoured to receive this award and thrilled to see my research recognized. This achievement inspires me to continue pursuing innovative approaches to advance the field of pharmaceutical crystallization."

For the Best Industry Presentation

Katie Foster & Alan Collier, Syngenta

Katie: "So grateful for the award, really lovely to receive, my colleagues are very proud."

For the Best Technician Presentation

Andrew Stewart, University College London

“I was pleasantly surprised to win the award, and pleased my talk was well received. It was fun to see how the application of machine learning to image segmentation being well received, its a very positive thing to have others enthusiastic to apply the software we have developed, and use it in ways we could never imagine. This award will help me progress in my career, and demonstrate the recognition of my peers, it also inspire me to keep developing towards the next breakthrough which can benefit the community. “

For the Best Senior Researcher Presentation

Damien Batchelor, University of Leeds

“Winning this award feels fantastic! It's great to have the time and effort that goes into both preparing a talk, and the underlying research recognized, which in turn boosts motivation for my research going forward. Hopefully this award can play some part in helping me progress to the next stage of my career (making it as an independent researcher!).”

For the Best PhD Presentation

Saba Saifoori, University of Leeds

“Receiving this award is an incredible honour and a moment of immense pride for me. This recognition not only validates the hard work and dedication I have put into my PhD but also inspires me to strive for even greater achievements.”

For the Best Technician Presentation

Shi Shi, University College London

"My field is construction materials, and I have conducted extensive research related to cement chemistry. I feel incredibly fortunate to attend Forge 2024, especially since this is my first time participating in a conference outside of my usual area of expertise. Having applied various analytical techniques to characterize cement and concrete samples, I found this conference to be a perfect fit for my work. Throughout the event, I gained valuable insights, ranging from career inspiration to technical knowledge in materials characterization. For example, Prof. Clive Roberts shared his experiences in running a business, while Prof. Marc-Oliver Coopens highlighted how "engineers mean innovation". Additionally, Dr. Jeremy K. Cockcroft, Prof. Nicole Hondow, and Rhys Kelham presented case studies on the application of XRD, SEM, and FTIR, all of which are highly relevant to my research. Exchanging ideas in person is invaluable, as we can't learn everything from platforms like Google Scholar. I greatly appreciate the opportunity for this interdisciplinary communication. I would also like to extend my thanks to Dr. Han Wu for inviting me to attend the conference and to the UCL Technical Research Hub for sponsoring my participation. Finally, I am deeply honoured to have received the Best Technical Presentation award."

C. UPDATE CORNER

C.1 The Forge Review: Linking Particle Characterisation to Industrial Needs

A brief overview by Phil Jackson

The Forge 2024 event had as a clear goal: Providing delegates with examples of how powder characterisation can (i) assist the industry in improving existing products and (ii) support new product development. Although by no means exhaustive, a quick review of the presentations together with a quick scan of the Forge booklet revealed the following findings. They are, I believe, proof that the Forge 2024 delivered on it's promises.

Schematic 1 shows the industries / sectors represented at the conference. As expected, powders were highly relevant to processing routes used by many industries.

Schematic 1: Industries represented at the Forge 2024

- Pharmaceuticals
- Catalysis
- Battery
- Mechanical Engineering
- Biomaterials
- Food
- Transport
- Advanced Ceramics
- Agriculture
- Energy

One of the outcomes of the Forge was that several industry professionals shared their input in the challenges faced by the industry. Schematic 2 below summarizes these.

Schematic 2: Industries represented at the Forge 2024

Increasing Yields
Reducing Cycle Times
Better Controlled Release of Drugs / Other Actives
Analysis / removal of Foreign Bodies in Powders
Novel Excipients to Cater For Lifestyle Choices
Achieving personalized medication
H&S, Powder Flow and Powder losses associated with powder electrostatic charging
Poor bioavailability in emerging drugs
Reduced reliance on natural gas / oil resources .....
.....and / or Using natural reserves more efficiently
Avoiding spurious powder measurements to avoid losses, waste
Inconsistent die filling
Poor air quality in cities
Better use of by products from mining
Unwanted / poorly quantified particle breakdown during dry powder handling
Better quantification of amorphous vs crystalline forms of API (linked to efficacy)

Finally, it is important to consider the enablers that will help solve the challenges listed in Schematic 2. Of course, each and every analytical technique highlighted in the presentations is an enabler, but the conference also pleasingly indicated a number of generic enablers (see Schematic 3) that have important roles to play.

Schematic 3: Generic Enablers to support better Powder Processing

Additive Manufacturing / 3D-Printing
Machine Learning
Molecular Dynamics
Design of Experiment (DoE)
Artificial Intelligence (AI)
In-line, real time PS analysis
Design inspired by nature
Micro-bubble technology (e.g. carrying actives in gas or liquid phase

C.2 Other upcoming events of interest

UK-based events

UK and Ireland based events this year that may interest our readers include:

International Conference on Molecular Materials Chemistry and Nanostructures (ICMMCN-2025), March 3, 2025, Edinburgh **https://allconferencealert.net/eventdetails.php?id=2950756**

Academy of Pharmaceutical Sciences (APS), 27-28 March 2025, Glasgow **https://apsgb.co.uk/event/transforming-pharmaceutical-development-with-mcs-plus-and-digital-innovation-meeting-2025/**

Crystallisation Science and Engineering, April 1-3 2025, Leeds **https://www.rsc.org/events/detail/80457/crystallisation-science-and-engineering**

International Conference on Pharmacy and Pharmaceutical Science (ICPPS-2025), April 25, 2025 **https://allconferencealert.net/eventdetails.php?id=2806000**

UCL Technical Staff Showcase 2025, June 25-26, 2025 **https://www.ucl.ac.uk/events/**

MESOX, May 02 2025, Birmingham, Digital Formulation: Shaping the Future of Sustainable Medicines Manufacturing · Luma, **https://lu.ma/dowj6in5**

Global Congress on Nanotechnology and Materials Science (GCNMS2025): May 19-21, 2025, London **https://optimumresearchmeetings.com/nanoconf2025/**

CHEMUK2025,May 21-22 2025, Birmingham, **https://www.chemicalukexpo.com/**

Drugs Research Network Scotland Annual Conference, June 5 2025, University of Dundee, Scotland, **https://drns.ac.uk/event-calendar/**

London Biotechnology Show June 18-19 2025, London, **https://www.eventbrite.co.uk/e/london-biotechnology-show-tickets-959283933067?aff=ebdssbcategorybrowse&keep_tld=1**

International Symposium on Nanoparticles and Nanomaterials (ISNN 2025): June 24-26, 2025, Edinburgh

17th International Conference on Materials Chemistry (MC17): July 7-10, 2025, Edinburgh **https://www.rsc.org/events/detail/77989/17th-international-conference-on-materials-chemistry-mc17**

International Conference on Industrial Chemistry and Engineering (ICICE-2025), July 17 2025, London **https://allconferencealert.net/eventdetails.php?id=2997217**

International Conference on Nanoscience, Nanotechnology and Advanced Materials, July 18, 2025, Manchester, **https://www.allconferencealert.com/event/1293252**

PASCOS 2025, the 30th International Symposium on Particles, Strings and Cosmology: July 21-25, 2025, Durham **https://conference.ippp.dur.ac.uk/event/1371/**

Precision Global Forum on Nanotechnology and Nanomaterials (PGNANO2025): August 11-13, 2025, London **https://www.reoozveltforum.org/pnano-2025**

International Conference on Particle Science and Technology (ICPST 2025): August 12-14, 2025, London

39th ECIS UK Colloids 2025 Conference, September 7-12, 2025, Bristol **https://www.soci.org/events/colloid-and-surface-chemistry-group/2025/39th-ecis-uk-colloids-2025-conference#:~:text=Its%2039th%20edition%20will%20be,on%207th%2D12th%20September%202025**

International Conference on Nanomedicine and Nanobiotechnology (ICNB 2025): September 23-25, 2025, Cambridge

C.2 Other upcoming events of interest

UK-based events

Particle Science and Technology Symposium 2025: October 5-7, 2025, Edinburgh

42nd Global Summit on Nanoscience and Technology, October 21-22, 2025 London. **https://nanosummit.conferenceseries.com/**

Global Nanotechnology Summit 2025: October 20-22, 2025, Manchester

International Conference on Environmental Biotechnology and Sustainability: December 30, 2025, Edinburgh

Non – UK and Ireland events our readers may be interested in include:

10th World Congress on Recent Advances in Nanotechnology, April 6-8 2025, Barcelona, Spain, **https://rancongress.com/**

7th International Conference on Nanomaterials Science and Mechanical Engineering, July 8-11 2025 Aveiro, Portugal. **https://www.rsc.org/events/detail/80583/7th-international-conference-on-nanomaterials-science-and-mechanical-engineering**

11th International Conference on Bioengineering and Biosciences: August 21-23, 2025, Paris, France.

International Conference on Particle-Based Methods (PARTICLES 2025) October 20-22 2025, Barcelona, Spain. **https://particles2025.cimne.com/objectives**

International Conference on Environmental Biotechnology and Food Security: December 30, 2025, Geneva, Switzerland.

EMRS (European Materials Research Society) - 2025 Spring Meeting, 26 - 30 May 2025, Strasbourg, France, **https://www.european-mrs.com/meetings/2025-spring-meeting**

FEMS 2025 - EUROMAT, 18th European Congress and Exhibition on Advanced Materials and Processes, 14 - 18 September 2025, Granada, Spain, **https://euromat2025.com**

NANOCON (17th International Conference on Nanomaterials), 15 – 17 October 2025, Brno, Czech Republic, **https://www.nanocon.eu/en/**

Some more events of interest are below and dates are to be confirmed.

UK Particle Technology Forum 2025: Dates to be confirmed, Manchester, UK. This forum will cover various aspects of particle technology and characterisation

PARTICLES 2025, International Conference on Particle-Based Methods: Dates to be confirmed, UK. This conference will address the fundamental basis and applicability of state-of-the-art particle-based computational methods

Crystallisation Science and Engineering: Dates to be confirmed, UK

The PCIG are always happy to hear about up-and-coming events that our members are interested in. If you have any suggestions for events to be included in our newsletters, please contact us and we will include these in our next edition.

CONTACT US

Visit our own website for further information: https://pcig.co.uk/ or go to our official RSC-website:

https://www.rsc.org/membership-and-community/connect-with-others/through-interests/interest-groups/particle-characterisation/

Do you have any questions, feedback or are you willing to contribute as a collaborative writer? Please email the RSC-PCIG Particle Newsletter Team via: **Particlenewsletter@gmail.com** and we will get back to you.