

## Newsletter 1 (PCIG N1) - 26.04.2023

Welcome to the first edition of our brand new newsletter!

### 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 (January – April 2023) 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 current edition team includes **Tien Quach, Merel Bout, and Mauro Davide Cappelluti**. 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.*

## A. RESEARCH HIGHLIGHT

### Introduction: What can we achieve with Particle characterisation?

Written by: Merel Bout

Almost everything that we deal with is made up from particles. All these particles together determine the properties and make up of a material. An easy example of a material to think about is sand. Sand is a collection of small particles of rock granules. These granules mostly consist of silica. But we can also think of particles as small as electrons or something as big as stars as particles. This not only makes particle characterisation a very broad subject but also a very interesting one to dive further into!



*(image credit: Maocheng, Bobanny, Marshall Space Flight Center (MSFC))*

Particles are characterized in numerous fields to learn more about materials and predict their behaviour. In industries, these characteristics can be critical as they are important indicators of quality and performance. At this present day, we have a wide range of techniques available to characterize particles. It depends on what information you are looking for. If we get back to our example of sand, we can look at this material in different ways. These ways involve the physical or chemical nature of the material. Analytical techniques have developed into a broad spectrum. Some examples of conventional techniques for chemical analysis are IR, RAMAN, NMR, X-ray analysis and elemental analysis. The exact chemical composition of sand can tell you the origin where the sand was derived from. It can also tell you how reactive the sand will be with other materials. On the other hand, the physical properties of sand can tell you what it will behave like under flow or during compaction. Some examples of conventional techniques for physical analysis are morphological analysis, SEM and DLS/ Zeta-potential. It studies the size, shape, distribution, surface area and colour of particles. To find out the size shape and distribution, we use microscopes. Another way to analyse the size distribution is by the effect of light scattering. Other properties that can be examined are density and porosity by gas adsorption.

This edition we would like to share a subject whose creation was made possible using particle characterisation techniques.

## Aerogels – Something new, something old

Written by: Merel Bout



*(Image credit: Aerogel.org)*

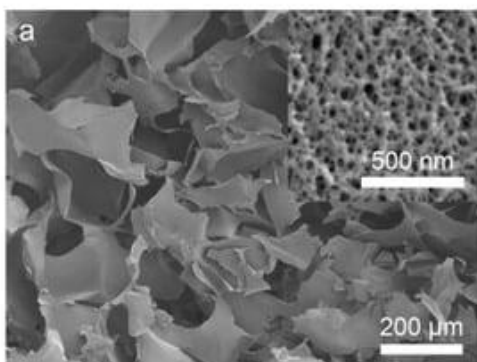
The principle of aerogels is not something relatively new. It was invented almost 100 years ago but even to this day, advancements have been made to improve the material and its applications. Aerogels are a unique type of solid that has the lowest-density of any known solid. This is due to their porous, sponge-like structure. The name aerogel is derived from the structure that it is derived from (a gel made into a solid). From the gel, fluid is removed without changing the material's structure. The name aero stems from that the density is extremely low that it feels like you are holding onto air.

Typically, an aerogel is composed of silica but other metals or polymers have been used. Aerogels composed of silica remain quite brittle. So, by adding other compounds like metals, this was an effort to enhance the strength and improve this mechanical property. Either way, aerogels are due to their characteristics (porous, low density and surface area) great thermal insulators and adsorbents. As seen below, a thin layer of aerogel prevents the flame from burning a flower. The hot air molecules are not able to reach the flower but are trapped within the porous structure of the aerogel.



*(image credit Lawrence Berkeley National Laboratory)*

Aerogels are also applied in removing different water pollutants where they are used to trap specific heavy metals, oils, organic materials, pesticides and toxins from water. For this same reason, aerogels can be used for solid-phase extraction (SPE). They can capture trace analytes and improve the extraction efficiency.



*(Image credit: Osorio, D.A. et al. Cross-Linked Cellulose Nanocrystal Aerogels as Viable Bone Tissue Scaffolds. Acta Biomater. 2019, 87, 152–165)*

The characterisation of aerogels is mostly steered towards their greatest asset: their pore size distribution and surface. The analysis is performed by SAXS, XRD, SEM, gas adsorption and laser microscopy. These techniques cover the range of assessment of the volume and pore size distribution. Aerogels have advanced themselves into other new areas: bio-aerogels that can promote wound healing by capturing bacteria, or as a drug delivery system to increase the solubility of a drug. Despite these advancements, the techniques to characterise them have remained quite conventional. As we have travelled into the nanoporous-range for aerogels, precise techniques are currently still lacking. However, we expect that this product will help drive towards the development of better analytical techniques for particle characterisation.

- (1) <https://sumltd.com/2020/12/17/aerogel-insulation-blankets-benefits-and-applications/>
- (2) Sun, M. Development of aerogels in solid-phase extraction and microextraction. 2022. <https://www.sciencedirect.com/science/article/abs/pii/S0165993621003204>
- (3) Mariana, M. Recent trends and future prospects of nanostructured aerogels in water treatment applications. 2022. <https://www.sciencedirect.com/science/article/pii/S2214714421005687>
- (4) Nita, L. New Trends in Bio-Based Aerogels. 2020. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7284463/>
- (5) Xiong, X. Preparation and Characterization of Electrospayed Aerogel/Polytetrafluoroethylene Microporous Materials. 2021. <https://www.mdpi.com/2073-4360/14/1/48>
- (6) Horvat, G. A Brief Evaluation of Pore Structure Determination for Bioaerogels. 2022. <https://www.mdpi.com/2310-2861/8/7/438>
- (7) Di Luigi, M. Scalable and robust silica aerogel materials from ambient pressure drying. 2022. <https://pubs.rsc.org/en/content/articlehtml/2022/ma/d1ma01086g>

## B. PEOPLE FOCUS

### Get to know

Our PCIG committee members are:

#### **Officers**

Chair: Chris Williamson  
Treasurer: Han Wu  
Secretary: Brian Miller

#### **Ordinary members**

John Gamble  
Simon Lawson  
Karen Pardoe (Meetings Secretary)  
Michael Tucker  
Steve Ward-Smith (Events Secretary)  
Caroline Welch  
Leon Xydias  
*Vacancy*

#### **Co-opted**

Merel Bout  
Mauro Davide Cappelluti  
Mel Disher  
Phil Jackson  
Tien Quach  
*Vacancy*

Over the next editions, (committee) members can share their stories about their experiences and background. If you have an interesting story to share, do not hesitate to contact us! Also, as seen above, there are vacant spots for members to join the committee.

### Inspiring stories

Written by: Tien Quach

*As an illustration, I would like to tell you about my first-year studying abroad (2018-2019) which made deep impression on my memory. I really hope you can share your own stories with me and others.*

#### **A start for something new!**

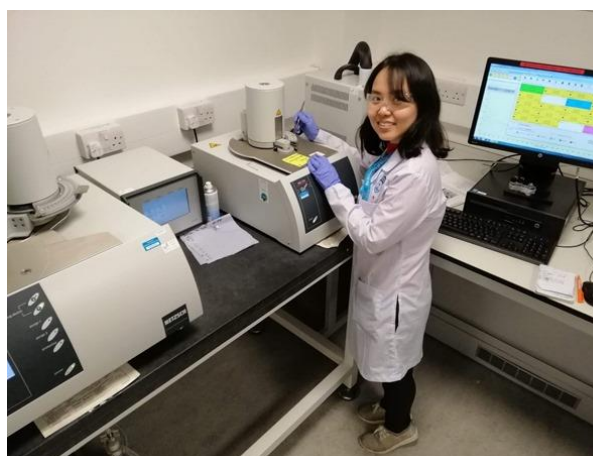
I am Tien Thuy Quach, but just call me Tien which means a fairy or one type of flower in English. I am from Ho Chi Minh City, Vietnam and I am very proud of my home country as one of the most beautiful and friendly countries. I hope more people can come to visit and love my country like me. However, this story is about my journey outside Vietnam as a present to people who are going to study abroad. My experiences about first year living abroad (from 2018 to 2019) will be divided into three key themes, which include: 1) studying-doing research, 2) working-volunteering, and 3) traveling-joining extra activities. I hope everyone can find their favourite part of my story.

#### **PART 1: STUDYING-DOING RESEARCH**





1. My journey started in September 2018



2. Lab work at CMAC since May 2019

Firstly, I was lucky to receive the “Faculty of Science Elite Scholarship Program” from the University of Strathclyde for my Master program of Advanced Pharmaceutical Manufacturing starting in September 2018 (1). I found this University quite true as “The Place of Useful Learning” despite small limitations in its system. I could get access to the comprehensive lectures, tutorials, and laboratories in the Strathclyde Institute of Pharmacy and Biomedical Sciences (SIPBS) and Continuous Manufacturing and Crystallisation (CMAC). After investing a lot of effort into self-learning and receiving appropriate supports from my supervisors, lecturers, and friends, I could graduate in November 2019 with a Distinction degree and kept looking for the PhD scholarships to continue doing research in the pharmaceutical science. As you can see, my great achievement is not only receiving the PhD Studentship from the University of Nottingham (2), but also having a memorable time with many people at different places. Please feel free to share with me any comments and follow other parts of my story (such as **PART 2: WORKING-VOLUNTEERING**) in the future!



3. My first snow at the University of Nottingham in February 2020

P/s: In the context of the outbreak of Corona Virus (COVID-19) all over the world, I hope that we can take good care of ourselves and remind other individuals to be more alert, pay attention to take the recommended protective measures (3). Please stay healthy to be able to complete and share your own journey!

(1) <https://www.strath.ac.uk>, (2) <https://www.nottingham.ac.uk>,

(3) <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>

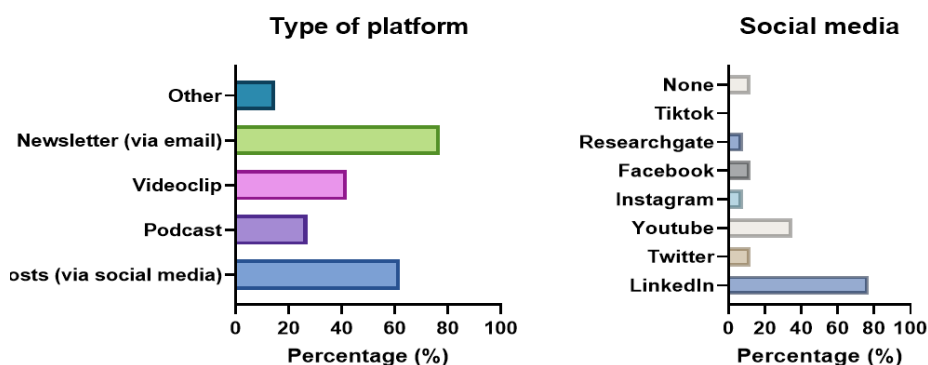
## C. UPDATE CORNERS

### Questionnaire results

Written by: Merel Bout

The PCIG is an interest group that exists now for 60 years. Just as science is always evolving, we also like to hear how we can evolve as an interest group. In the month of February 2023, we asked you what your current thoughts are on the PCIG. We received a number of industrial respondents covering a wide range of sectors (Pharma, Forensics, Food, Chemicals, Coatings, filler for Plastics etc.). Thank you very much for filling this in, the feedback is very helpful for us to bring you the right information! The outcome of your answers are presented below.

Of the platforms available, you have the most interest to receive information via newsletter (so here we are!), a videoclip or podcast and through posts on social media. The most popular social media are Youtube and LinkedIn.



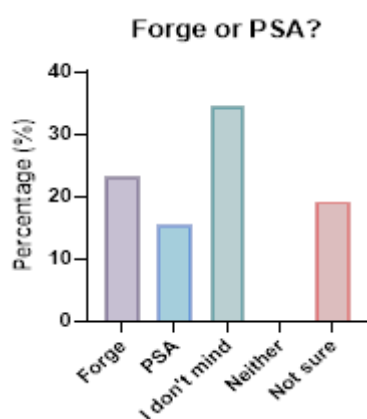
At the PCIG, we organize various events: summer school, training and outreach programmes. The frequency of activities that you would like to be involved with differs from monthly-annually. However, a lot of you were unsure about how many times would be best. In the case of webinars, the frequency would seem to be quarterly or annually (depending on online or in-person). In the case of summer school, we only seem to target a certain audience as a third of answers voted not interested and a third voted for annually.

Response (%)	Monthly	Quarterly	Annually	Not Interested	Unsure
<b>Conference - webinar (online)</b>	12.5	41.7	33.3	4.2	8.7
<b>Conference - webinar (in-person)</b>	0.0	0.0	54.5	18.2	26.1
<b>Training - Summer school (online)</b>	0.0	4.2	33.3	29.2	34.8



<b>Training - Summer school (in-person)</b>	0.0	0.0	26.1	26.1	47.8
<b>Outreach programmes - external events (online)</b>	4.2	16.7	29.2	8.3	43.5
<b>Outreach programmes - external events (in-person)</b>	0.0	8.7	26.1	17.4	47.8

Some conferences that we organize at the PCIG are the PSA (Particle Size Analysis) conference which ran from 1966-2014 and more recently the Forge from 2021. PSA targets no specific focus group (all research is welcome) while the Forge is more focused on particles being used in areas such as formulations, with a focus on the work early career scientists and inspiring plenaries. We asked which of these type of conferences would be your preference. Most of you answered that both were good options while some were not sure what to choose. A direct vote between Forge and PSA favoured the Forge slightly.



It seems like an annual conference would work best for most members but (as alluded to in responses to other questions) there is clearly concern about (i) spending >1 day at a conference and (ii) travelling too far to attend a conference (own country or maybe Europe for UK respondents). That is something that we keep in mind by organising online and hybrid events for long-distance members.

We received lots of ideas for future seminars that we can use. The answers seem to suggest to keep seminars at a fairly simple and practical level so you can right away apply what you have learned. Another mention is that the PCIG seems now geared towards solids and we are aiming to broaden to other states of matter as well.

Keep an eye out on what is to come, as we will update you on any events in the future!

## Exhibitions – Trade Shows (Free to attend)

Written by: Mauro Davide Cappelluti

- 7<sup>th</sup> - 8<sup>th</sup> June: **TCT 3Sixty**  
NEC, Birmingham  
Find more information at: <https://tct3sixty.com/>
- 27<sup>th</sup> - 30<sup>th</sup> June: **Graphene2023**  
13th edition of the largest European Conference & Exhibition in Graphene and 2D materials  
Engineering Building A, The University of Manchester  
Find more information at: <https://www.grapheneconf.com/2023/index.php>
- 28<sup>th</sup> - 29<sup>th</sup> June: **The Advanced Materials Show**  
NEC, Birmingham  
Find more information at: <https://advancedmaterialsshow.com/>
- 28<sup>th</sup> - 29<sup>th</sup> June: **The Advanced Ceramics Show**  
NEC, Birmingham  
Find more information at: <https://advancedceramicsshow.com/>

## Academic conferences, workshops, events

- 5<sup>th</sup> -19<sup>th</sup> May: **The 4th International Online Conference on Nanomaterials**  
**Online event**  
Find more information at: <https://iocn2023.sciforum.net/>
- 15<sup>th</sup> -18<sup>th</sup> May: **Inhaled Particles and NanOEH Conference**  
Hilton Manchester Deansgate, Manchester  
Fees: £ 300 (Student, retired, developing countries delegates); £ 450 (conference speakers); £ 600 (BOHS members, £ 520 early bird – by 31/03); £ 700 (Non-members, £ 620 early bird – by 31/03)  
Find more information at: <https://www.bohs.org/events-networking/events/upcoming-events/detail/inhaled-particles-and-nanoeh-conference-2023/>
- 21<sup>st</sup>- 25<sup>th</sup> May: **Fluidization XVII**  
Sheraton Grand Hotel & Spa, Edinburgh  
**Deadlines:** 15/3 Abstract submission; 24/4 Early bird registration  
**Fees:** \$ 995 (students – up to post-doc), \$895 early bird); \$1545 (industrial professional, \$ 1345 early bird); \$ 1345 (academic professional, \$ 1195 early bird)  
Find more information at: <https://www.aiche.org/conferences/fluidization/2023>

- 19<sup>th</sup> – 20<sup>th</sup> June: **6<sup>th</sup> Annual UK Porous Materials (UKPorMat) Group Conference**  
Hall University, University of Sheffield, United Kingdom  
Registration opening soon  
*Fees: not indicated*  
Find more information at: <https://www.ukpormat.com/> and  
<https://www.rsc.org/events/detail/75797/6th-annual-uk-porous-materials-conference>
- 19<sup>th</sup> – 22<sup>nd</sup> June: **Nanomed Europe 23 (NME23)**  
University of Liverpool  
*Deadlines:* 30/4 Abstract submission  
*Fees:* excluded extra fees £ 190 (students – up to post-doc); £ 400 (industrial professional, £ 0 (free) for ETPN members  
Find more information at: <http://www.nme23.eu/>
- 21<sup>st</sup> – 23<sup>rd</sup> June: **10<sup>th</sup> International Granulation Workshop (2023)**  
University of Sheffield  
*Fees:* £ 600 (students), £ 700 (standard)  
Find more information at: <https://www.sheffield.ac.uk/agglom/10th-international-granulation-workshop-2023>
- 23<sup>rd</sup> June: **Cambridge Particle Meeting**  
Find more information at: <https://cambridgeparticlemeeting.org/>
- 17<sup>th</sup> – 19<sup>th</sup> July: **UK Colloids**  
ACC Liverpool, Kings Dock, Liverpool Waterfront, Liverpool  
Deadlines: 05/05 (early bird registration); 10/7 (poster abstract)  
Fees: £ 450 (student members & retirees, £ 400 early bird); £ 500 (non-member students, £ 450 early bird); £ 625 (RSC & SCI members, £ 575 early bird); £ 725 (non-members, £ 675 early bird)  
Find more information at: <https://constableandsmith.com/events/uk-colloids-2023>  
and <https://www.rsc.org/events/detail/38442/uk-colloids-2023>
- 21<sup>st</sup>- 24<sup>th</sup> August: **9<sup>th</sup> UK-China International Particle Technology Forum / 18<sup>th</sup> Particle Technology Early Career Forum**  
Stockwell Street Library, University of Greenwich  
Deadlines: 15/5 early bird registration  
Fees: £ 410 (students, £ 350 early bird); £ 610 (CSP and IChemE members, £ 500 early bird); £710 (non-members, £ 550 early bird)

Find more information at: <https://constableandsmith.com/events/uk-china-PTF9-2023>

## International events

- **11<sup>th</sup> – 14<sup>th</sup> June: 12th International Colloids Conference**  
Palau de Congressos de Palma, Mallorca, Spain  
**Deadlines:** 14/3 early bird registration  
**Fees:** € 466 students; € 883 academic delegates  
Find more information at:  
<https://www.elsevier.com/events/conferences/international-colloids-conference>
- **26<sup>th</sup>- 28<sup>th</sup> September: Partec 2023: International Congress on Particle Technology**  
Nürnberg Convention Center (NCC) Ost, Nuremberg, Germany  
**Deadlines:** 03/04 early bird registration  
**Fees:** € 475 (students, € 395 early bird); € 795 (Academics, Speaker and Poster presenters, € 695 early bird); € 995 (Industry, € 895 early bird)  
Find more information at: <https://www.partec.info/en>
- **9<sup>th</sup> -11<sup>th</sup> October: VIII International Conference on Particle-Based Methods (PARTICLES 2023)**  
Palazzo delle Stelline Conference Center, Milan, Italy  
**Deadlines:** 16/4 (one page abstract submission); 2/6 (early bird and speaker registration); 1/9 (paper submission)  
**Fees:** € 622 students (€ 500 early bird); € 854 standard (€ 732 early bird)  
Find more information at: <https://particles2023.cimne.com/objectives>

## Particle Instrument upcoming webinars

Hosted by Microtrac: <https://www.microtrac.com/news/seminars-webinars/>

Hosted by Malvern Panalytical: <https://www.malvernpanalytical.com/en/learn/events-and-training/webinars>

Hosted by Anton Paar: <https://www.anton-paar.com/uk-en/services-support/webinars/>

## CONTACT US

Visit our website for further information: <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](mailto:Particlenewsletter@gmail.com) and we will get back to you.