RSC INTEREST GROUP
PROCESS CHEMISTRY AND TECHNOLOGY
https://www.procchem.group

# Newsletter

***March, 2020***

## Improving Our World by Advancing the Application of Chemistry at Scale

The chemical sciences are vital for the wellbeing of our world. The know-how to efficiently and safely perform chemistry at industrial scale is a critical element – this is the focus of this interest group.

## ABOUT THE PROCESS CHEMISTRY AND TECHNOLOGY GROUP

The vision of this group is to be a place where process chemistry and process technology join together and to bridge the gap, aid innovation and raise awareness of current issues in the field. The PCTG, comprising some 800 members across multiple sectors, is led by an enthusiastic committee of professionals, all of whom are active in this field.

The PCTG, through its membership and networks, are leading the way to challenge the UK industry to think differently about how to approach the world's future process chemistry and technology challenges.

**By engaging with the PCTG you can:**

- Promote and contribute to the advancement of industrial-scale process chemistry and technology
- Develop your skills and understanding by learning from experts in the field
- Boost your career, raise your profile, and build your network of like-minded chemical scientists from industry and academia

## THE COMMITTEE

**Chair:** Dr. Carl Steele CChem FRSC (Orano Projects Limited)
**Treasurer:** Mark Hughes *MRSC* (ex-GSK)
**Secretary:** Dr Peter Clarke CChem MRSC (xSeriCon Ltd.)
**Committee Members:**
Dr Mukund Chorghade CChem FRSC (THINQ Pharma),
Dr Bethan Coulson *MRSC* (Johnson Matthey Fuel Cells),
Dr Charles Gordon (Scale-up Systems), Richard Hart *CChem CSci FRSC* (AstraZeneca),
Dr Phil Kay *CChem MRSC* (JMP),
Professor David Littlejohn *FRSC FRSE* (University of Strathclyde),
Dr Andrea Parr *MRSC* (CPI),
Professor Siddharth Patwardhan *CChem FRSC* (University of Sheffield).

**Interested in Joining the Committee?**

New members are always welcome, to help us drive our exciting programme of activities and projects. The Committee meets 3 times per year in London. On the other 9 months of the year, the Committee meets by teleconference. Several committee posts will be up for election in the second half of 2020.

## Ways to contact PCTG

LinkedIn **Website**: www.procchem.group **Email**: rscpctg@gmail.com twitter

## RECENT EVENTS AND WEBINARS

### The morning after: UK Chemistry in a post-Brexit world

*10 April 2019, Manchester.*

This one-day symposium presented perspectives on the challenges and opportunities for UK Chemistry as a result of Brexit. A highly qualified panel of respected experts guided a small but engaged audience through the intricate issues raised by Brexit, and led open panel discussions.

### Webinar on process intensification

*17 July 2019.*

The American Institute of Chemical Engineers (AIChE) presented "Modular chemical process intensification: Discovering opportunities and overcoming challenges". More details here.

### How to Ensure Quality By Design

*8th October 2019.*

96 people attended our virtual seminar on October 8th 2019. Experts from industry and academia showed methodologies to help you design quality into your processes.

If you missed it there is a recording at Chemistry World website.

### Making it small: Energising entrepreneurship in the chemical sector

*15 November, 2019 London.*

A one day symposium on the challenges and how-to of being a chemical industry entrepreneur. See a report below.

### SynBIM symposium

*22-23 January 2020, Manchester.*

This symposium aimed at bridging the gap between bio-inspired nanomaterial chemistry and sustainable manufacture. This was part-funded by the PCTG and it was attended by 35 delegates from academia, industry and government. It showcased the outcomes from the SynBIM project and developed new ideas for future research. A detailed report to follow at www.synbim.co.uk.

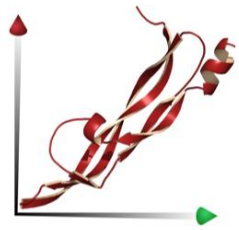
### CPACT webinars

PCTG works closely with the Centre for Process Analytics and Control Technology (CPACT). Their exciting webinar programme included the following webinars of interest to PCTG members:

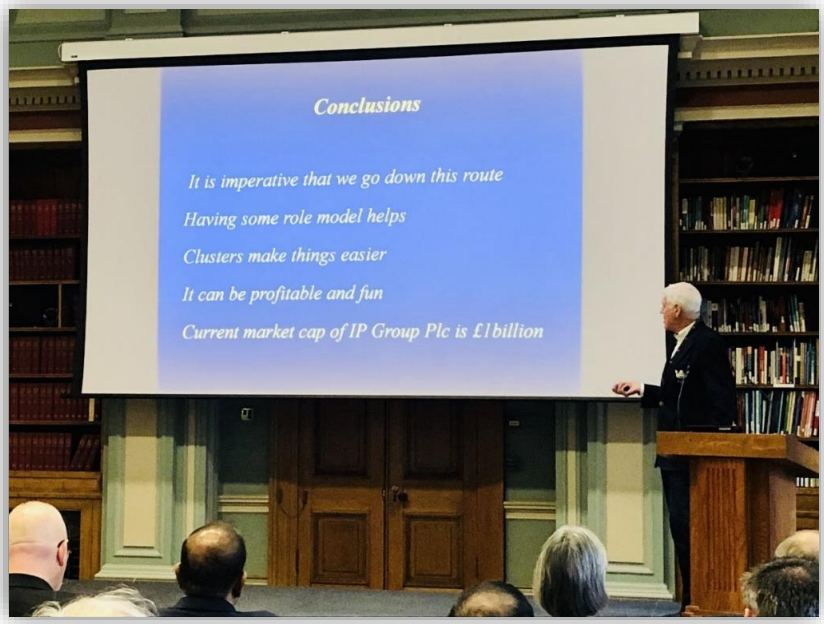
12/9 Who cares about reaction colour? kinetics from colour at any scale
26/9 Utilising hyper polarisation in NMR and MRI
9/10 The continuous manufacturing control strategy
24/10 Parameter estimation
7/11 PAT supporting particle generation
28/11 Spectroscopic analysis of fuel blends

## ENERGISING CHEMICALS ENTREPRENEURSHIP

*A summary of the symposium by Phil Kay*



The mission of the Royal Society of Chemistry Process Chemistry and Technology Group (PCTG) is to "bring together chemists and technologists active in all aspects of the application of chemistry at industrial scale." On 15 November 2019, we hosted "Making it Small: Energising Entrepreneurship in the Chemical Sector" at Burlington House in London. I attended as a PCTG committee member and as someone who has always wondered what it takes to go from laboratory scientist to business leader.




We were very grateful to have eminent speakers from a broad range of industry and academia backgrounds. What brought them together was the conviction that entrepreneurship in the chemical sciences is vital and also that it can be extremely rewarding.

PCTG Chair Mukund Chorghade kicked off the symposium with stories about innovation and invention. “Invention might happen in the laboratory. Innovation happens in the market place.”

Mukund welcomed Professor Graham Richards of Oxford University and Oxford Drug Design for an inspiring keynote. Graham talked about the critical importance of commercialisation in creating jobs and finance for universities and the wider economy. He ran through the different spin outs from the chemistry department at Oxford that together have contributed £100M to the university. Some have failed but “the take-home message is that there is an awful lot of science around that can be made into money.” He also talked about a great miss from research at Oxford. His former colleague, John Goodenough, recently received the Nobel prize for the development of the lithium ion battery but the technology was never patented! Any practical advice for enthusiastic entrepreneurs? “Keep the company name simple.”

A theme throughout the day was the personal rewards of the commercial journey. Dr Elizabeth Farrant, CEO of New Path Molecular Ltd, talked about how “Making it Small in Chemistry” has given her a rewarding career after the frustrations of working for large companies. Getting off the ground was difficult for New Path Molecular until they generated IP that they could patent. Dr Farrant’s concluding advice was to pick your advisors carefully.

Dr Ross Burn, CEO of CatSci, talked about “the valley of death” between start-up and

scale-up and presented compelling lessons from winning entrepreneurs. More than 50% of UK start-ups fail in the first year and Ross thinks this is because they get the business model wrong. He quoted "the great scholar", Mike Tyson: *Everyone has a plan until they get punched in the mouth*. His advice included getting out and listening to people and getting the basic marketing in place.

Many speakers highlighted the importance of networking and Professor Colin Suckling of Strathclyde University told us how a serendipitous meeting in Japan with then First Minister of Scotland, Donald Dewar, was key in the success of commercialising a drug they had developed. Colin and his collaborators are now using their experience to tackle the critical challenge of antibacterial resistance because this is the kind of activity that doesn't fit the business model of big pharma. "Building and maintaining partnerships takes time" so patience is required.

In the third session Professor Peter Styring of Sheffield told us "de-carbonisation is wrong! It is de-fossilisation that we need to do." It was great to hear about chemical technologies that are providing solutions to a big problem in his fascinating talk on "Redefining the Carbon Cycle." Peter related that it is difficult to be entrepreneurial in this area because competing with subsidised petrochemicals makes it unprofitable. And generating IP that will be secure adds another challenge. Dr Olga Shvarova of McGrigor Group told us about technology transfer and mirrored Mukund's earlier statement: "Universities are the major source of ideas but innovation can only happen with successful commercialisation."

The story of Quorn featured in the talk by Professor John Blacker from Leeds University. The project was a technical success and developed capabilities that became a linchpin in industrial biotechnology. However, it was initially a commercial failure. John said that business success hardly ever comes from a great invention creating a market. So it is important to first establish a market need. He also mentioned the Centre for Doctoral Training in Molecules to Product and the Institute of Process Research and Development that are bridging academia and industrial needs.

Interestingly Professor Will Zimmerman from Sheffield University told us about one of the exceptions to John's advice. Will explained how he created a successful spin out without first finding a market need. He invented a technology to create micro-bubbles and then found useful applications including removal of ammonia from waste waters. Biological processes create a lot of ammonia and most of the time we spend energy to destroy it. Capturing ammonia using carbon dioxide is a win-win: carbon capture and ammonia for fertilisation in agriculture.

Finally, Professor Siddharth Patwardhan - also from Sheffield University – started by saying that he is the only speaker that does not have a company. He came to the event to learn. Siddharth's focus is on nanomaterials because their production is one thousand times more wasteful than typical chemical products. Porous silica particles have great value in emerging markets, including carbon capture, but manufacturing the best quality is so energy intensive that it is not economical at useful scales. A bioinspired green technology is the solution. The other speakers had lots of advice for Siddharth.

In his closing comments, Professor Steve Ley of Cambridge University said that the opportunities for entrepreneurs are enormous and this event shows that the community is alive and well. Steve said we should focus on getting people into the right jobs because, while not everyone is suited to being an entrepreneur, not everyone is suited to laboratory research.

This event was great for learning what it takes to be a successful entrepreneur in the chemical sciences. And, for me, it was particularly great to see how entrepreneurial energy and chemicals technologies are being directed to solving the biggest global challenges.

Right at the end of the day I spoke with a young post-grad. He said that the event was incredibly useful for helping him in deciding whether to pursue commercialising the technology that he has been working on.

## UPCOMING EVENTS

### Webinar on Process Safety

21st Apr, 2020 3-4 PM BST

The webinar will provide an awareness of process safety risks and its mitigation and some of the types of process hazards that can arise. The webinar will discuss a range of techniques that can be applied to mitigate risks. The webinar will explain some of the means to reduce the consequences of a hazardous event.

Add to Calendar  Join Webinar

### Visit to Bright Green Plastics

20th May 2020, Castleford, W Yorks

This company has an exciting vision to upcycle waste plastic into useful products. Join us for this opportunity to visit their site. Open to PCTG and RSC local section members. Registration required. Details here.

### Workshop on Quality by Design

4th June 2020, CPI National Biologics Centre, Darlington, UK.

Led by Martin Owen, ex-GSK expert consultant on QbD, and with a keynote talk by Walkeria Schlindwein, De Montfort University.

### Annual symposium: Innovations in process chemistry and technology

13th November 2020, London.

This symposium explores novel applications of chemistry, and the technology used to realise chemistry at scale, in the chemical enterprise. A wide range of topics, addressing latest developments and sustainability in multiple industry sectors such as pharma, speciality chemicals, nuclear, polymers, and sustainable chemistry will be explored. The focus will be on research, scale-up, and full scale operations with direct industrial applications. In bringing together experts from all across the industrial chemistry field, we aim to promote cross-fertilization of ideas and inspirations, empowering industry to address today's challenges.

### CPACT webinars

CPACT is offering exciting following webinar programme of interest to PCTG members:

- Update Webinar - Who cares about Reaction Colour? Kinetics from colour at (any) scale, 12 Mar 2020
- Statistical Impact within the Process Industries, 30 Apr 2020
- Design of Experiments Series, 21 May 2020

### Nordic-Irish Process Chemistry Forum 2020

12-14 May 2020, Titanic Quarter, Belfast, Northern Ireland

This is a gathering of top scientists in the field from the broader process chemistry/process R&D space. This event differs from previous forums, being based for the very first time outside the Nordic region. Click to see more details.