



# SOFI

# CDT NEWSLETTER

EPSRC Centre for Doctoral Training in  
Soft Matter and Functional Interfaces

November 2019



Cohort 6 white water rafting as part of their induction week activities with Piero Vitelli (Island 41 Ltd.).

## Note from the editor

Hi again, Kalila here ☺. It's a new academic year and we have some fresh faces in the form of cohort 6! Or should we call it cohort 1 of the rebranded SOFI<sup>2</sup>? Either way, we welcome them to the family. As usual, we have stories of travels, success and frolicking, so stop reading this drivel and get on to the interesting stuff!

## Cohort 6 Induction Week

Our introduction into life at Durham University and the SOFI<sup>2</sup> CDT couldn't have started more smoothly. On Monday, Linda kindly welcomed us all to the CDT hub before Mark Miller kicked the week off with an excellent welcome talk followed by an induction by Simon Rees. After getting an insight into what a PhD is about, we all headed to the pub!

On Tuesday morning we were greeted by Piero, our instructor for the next two days of team-building exercises. We solved logic problems and stacked wooden planks in a complicated structure before taking them apart and restacking them in an (almost) record breaking time. Wednesday was mostly spent under water at the Tees Barrage white water rafting centre. We learnt a lot about ourselves, the group's strengths and weaknesses, what makes the perfect team and that Reece is a highly competitive person. On Wednesday night we completed one of our 'challenges' which was to hold a social for Cohort 5 and ourselves. We had a great evening to round off the last two days of team-building.

Finally, Thursday and Friday were extremely productive as we completed an entire PhD in two days. We had groups curing cancer using CRISPR and ultrasound, creating a camera and sensor system that could monitor the country's driving, and creating a very expensive algorithm that could count apples. The entire cohort managed to write a mini thesis and passed their final vivas with barely any minor corrections!

Our first week as SOFI<sup>2</sup> students has been really fun and a great opportunity to learn a lot about the CDT process and gain an overview of the challenge of completing a PhD. Thank you very much to Lian, Piero, Mark, Simon, Linda and everyone who helped welcome us over this week.

Written by **Phoebe Lowy**



*Cohort 6 during their induction week.*

## Meet Cohort 6

Introducing the new cohort – go say 'hi' if you get the chance!

- **Joe Bradley** completed his integrated Masters in Physics at the University of Edinburgh.
- **Laura Confalonieri** a Laurea in Physics at the University of Milan and worked in industry for many years at ST Microelectronics and Hamamatsu Photonics.
- **Dom Corbett** completed a Masters of Science in Theoretical Physics at the University of Edinburgh. He also worked as a research assistant for the Oxford English Dictionary.
- **Eugénia Delacou** completed a Bachelor's degree in Chemistry and Biology followed by a two year Master's degree in Chemistry at Sorbonne Université (Paris, France).
- **Alex Gresty** completed an integrated masters degree in Physics at The University of Leeds.
- **Nicola Haynes** completed an integrated masters degree at the University of Bristol in Chemistry.
- **Phoebe Lowy** completed an integrated masters degree in Chemistry at Cardiff University with a year abroad at Monash University (Melbourne, Australia).
- **Reece MacDiarmid** completed an integrated masters degree in Chemistry at Heriot-Watt University.
- **Samuel Musson** completed an integrated masters degree in Chemistry at Durham university.
- **Jack Parker** completed an integrated masters in Physics at the University of Warwick.
- **Charles Tkaczyk** completed an integrated masters degree in chemistry at the University of Warwick.
- **Gerome Vancuylenberg** completed an integrated masters in physics at the University of Leeds.
- **Daniel Williams** completed an integrated masters degree in Physics at the University of Leeds with a year spent at the University of Waterloo.

## SOFI Staff Profile: Anwesha Sarkar

I am an Associate Professor of Food Colloids in the School of Food Science and Nutrition at the University of Leeds. My background is in food technology, having studied, researched and worked in the field internationally. After my PhD on the 'interfacial aspects of digestion of emulsified lipids' at Massey University, New Zealand, I joined the Nestlé Research Centre in Lausanne, Switzerland as a Project Manager, inventing new soft matter-based edible materials. Then, I moved to the Nestlé Global Headquarters in Vevey, Switzerland, as a Global Innovation Project Leader, where I led highly strategic technology-led projects. Following on, I decide to move back to academia in Leeds from 2014, where I am now leading a highly international research team of 2 postdocs, 7 PhD Students and 1 MRes student.

I am particularly passionate about generating mechanistic insights on how multiphasic colloidal structure interacts with human physiology at multiple length scales. To understand this, I use imaging, scattering, mechanical measurements (rheology and soft tribology) mostly *in vitro*, sometimes extending to *ex vivo* and real human trials. I am now leading a European Research Council (ERC) Starting Grant funded Project to discover oral lubrication mechanisms at multiple length scales. Watch [this space](#) to keep up-to-date with the latest findings on how my team is designing biomimetic surfaces to improve measurements in soft tribology. I supervise an excellent SOFI student, Morfo Zembyla from Cohort 2, jointly with Professor Brent Murray on a project linked to designing new complex interfaces for delivery of water droplets on a real industrial problem (with Nestlé). Morfo has already got 1 patent and 2 papers published! Outside work, I love travelling and getting to know new cultures through food, people and music – I have been lucky enough to have travelled to some exotic destinations in more than 30 countries in five continents!



*Dr Anwesha Sarkar*

## SOFI Alumnus: Michael Heeran

Hi, I'm Michael and I am a recently graduated member of the SOFI CDT guinea pig Cohort 1. After the initial SOFI training period, my time in the CDT was spent in Durham supervised by Dr Phil Dyer. My PhD work investigated solution-phase interactions and the resulting coordination-, thermo- and tribochemistry of engine lubricant additives. The project was sponsored by Nouryon (formerly AkzoNobel Specialty Chemicals) and during my PhD I was able to spend a short time doing testing in one of their labs in Sweden. Currently, as of February this year, I now work for Nouryon as a senior researcher, based in The Netherlands. I am enjoying living and working abroad and feel fortunate that the industry contacts generated through SOFI directly led me to gaining a job after SOFI.

## SOFI Student profile: Rashmi Seneviratne



Hello! I'm Rashmi Seneviratne from Cohort 3. I'm working with Paul Beales, Michael Rappolt and Lars Jeuken in Leeds, exploring the material properties of hybrid lipid/polymer membranes. Recently, I have been trying to combine SAXS and Cryo-electron tomography techniques to probe the structure of the hybrid membrane. I'm hoping to make Giant Unilamellar Vesicles soon, using fluorescent dyes and confocal microscopy to determine

membrane mixing, tension and lipid exchange. I have enjoyed doing my PhD and being a part of Cohort 3 in SOFI, especially. After my PhD, I hope to go into industry.



*Michael (right) at the CESIO conference in Munich earlier this year. Joke Speelman (left) was his industrial supervisor from Nouryon during his PhD.*

## Plastech Innovation Ltd. – ‘From Bottle Caps to Concrete’: A SOFI Student Spin-out

Written by  
**Natasha Boulding**

Cohort 2 students Natasha, Phil and Scott have spun out a company from Durham University. Plastech Innovation takes plastic waste and processes it into an aggregate for use in concrete and other construction materials. Aside from the eco-friendly aspect of limiting plastic pollution, the addition of plastic into concrete adds properties such as reduced weight, thermal insulation and sound reduction. Moreover, an important and much less reported global challenge is that construction grade sand resources are diminishing. This innovation aims to keep more plastic out of the ocean and more sand in.



*Recycled plastic waste turned into aggregate.*

After the idea was conceived at the SOFI CDT business summer school in June 2018, the team joined the first cohort of the Durham City Incubator ([@ DCIncubator](#)), an accelerator programme for entrepreneurs and growing businesses in County Durham. They have been successful in forging relationships with local businesses such as Biffa and Bespoke Concrete Products and Durham County Council. The team have had success in several national competitions, winning the 2019 ‘Bright SCIdeas Award’, April 2019 ‘Shell LIVEWire Smarter Future Award’ and the 2019 Durham Blueprint Startup Challenge and live pitch awards. They have also reached the finals of the 2019 Shell Top Ten Innovators and Tata Varsity Pitch (outcomes pending). Plastech Innovation is now in the process of advancing their technical programme, made possible by securing a grant from the Northern Accelerator programme.

After coming to the end of their supervised study, the team are now full-time directors of the company, have taken on their first employee and are now seeking seed round investment. The team would like to say a big thank you to Lian Hutchings, David King and Peter Allen for their time and mentoring.



### Contact us

Any questions, comments or introductions please contact  
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## SOFI at the 13<sup>th</sup> International Symposium on Ionic Polymerisation

Lloyd Shaw (Cohort 5), Dan Day (Cohort 3) and Lian Hutchings (CDT Manager) travelled to Beijing in September to represent SOFI CDT at the 13<sup>th</sup> biennial International Symposium on Ionic Polymerisation (IP 2019). As the only academic group in the UK still actively researching living anionic polymerisation, this conference gave us one of few opportunities to talk to and share ideas with world-leading scientists in this field. This was the first year that this symposium had been held in China and was hosted and organised by Professor Junpo He (Fudan University) and Professor Yixian Wu (Beijing University of Chemical Technology). Beijing certainly proved to be an exotic location for the conference – more so than IP 2017 which was held in Durham, which is not so exotic (but still lovely), as you all know! Lloyd, Dan and Antonella (also in Lian's research group) travelled to Beijing a couple of days beforehand to get accustomed to the culture, sightsee and of course eat a lot of excellent food. On the day of registration, we travelled to the conference centre where we checked into one of the most incredible hotels any of us had ever seen (they messed up our registration so we luckily got an upgrade). After check-in, we headed down to a welcome reception/buffet dinner where we got to meet some of the biggest names in the field of polymer chemistry including Krzysztof Matyjaszewski, Mitsuo Sawamoto and Rudolf Faust.



*Snapshot from the start of the 13<sup>th</sup> International Symposium on Ionic Polymerisation.*

Day 2 saw the start of the conference with lectures presented by researchers from around the world, on topics related (mainly) to anionic polymerisation and cationic polymerisation but also a few on other living/controlled polymerisation mechanisms. On Day 3, Lian presented a fairly controversial talk on "The Synthesis of Functionalised Solution Styrene-Butadiene Copolymers Exploiting Myrcene and the Fire and Forget Approach", which was well-received among the rest of the community but led to some very interesting questions and discussions. Later that night, it was Lloyd's turn to present a poster on "The Selective Functionalisation of Myrcene Containing Polymers", which expanded on some of the concepts Lian had discussed previously. Dan and Antonella both gave oral presentations on the Wednesday. Dan's talk was entitled "Preparation of Block Copolymers for Self Assembly in Selective Solvents". The week rounded off with an superb conference banquet with live performances - vocal, instrumental and dance – and we all enjoyed a very strong Chinese spirit (on the night, not so much the next day). Participation in such conferences are a real "perk of the job". Great science, a great experience and fantastic networking opportunities. If anyone gets the opportunity to go to a future Ionic Polymerisation Symposium (the next one will be in Ghent, Belgium) or the opportunity to visit China, we cannot recommend them highly enough.

*Written by Lloyd Shaw and Daniel Day*



## Save the date!

16-17th Dec 2019: Inter CDT conference in Durham.

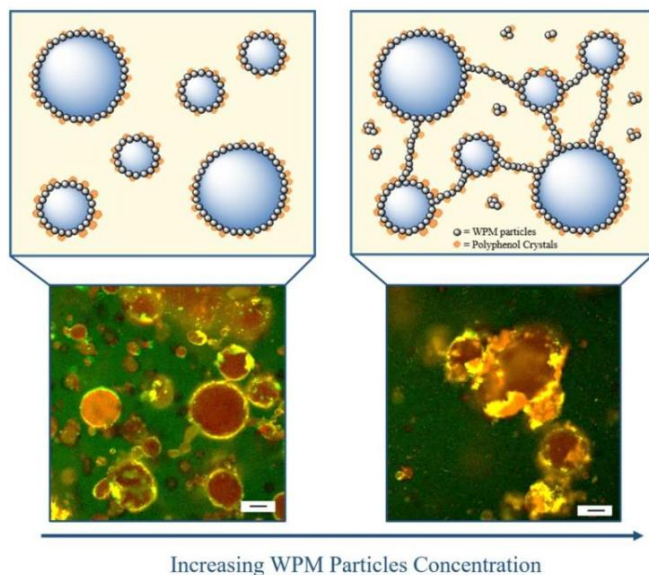
## SOFI Industry Partners

Do you have an urgent, short-term science or technology challenge? If so, there is probably a SOFI CDT PhD student with suitable research expertise who can work with you to seek solutions. SOFI students are able to participate in (up to) a 3-month secondment from their studies to work with industry partners on such challenges. If this is something you would like to explore further, please contact SOFI CDT manager, Lian Hutchings ([l.r.hutchings@durham.ac.uk](mailto:l.r.hutchings@durham.ac.uk)), for further information.

## Adele winner of Leeds '3 Minute Wonder' science communications competition

Adele Parry (Cohort 5) was one of two winners of the inaugural 'Three Minute Wonder' science communications competition held at the University of Leeds. The aim of the challenge was for participants to present their research in three minutes or less to a panel of judges and a non-specialist audience. Adele will now get travel paid for to compete in the Institute of Physics' regional Three Minute Wonder competition on Tuesday 5th November in Newcastle. Find out more about this national competition [here](#). Best of luck to Adele!

*Abstract diagram from Morfo's paper, featuring confocal images and schematic representations of her stabilised Pickering emulsions.*



## Morfo's published and patented biotechnology

Stabilising water droplets in an oil continuous matrix using biocompatible interfacial materials has always been a long-standing research challenge in colloid science. Morfo Zembyla, a Cohort 2 PhD Student supervised by Prof. Brent Murray and Dr Anwesha Sarkar at the University of Leeds, engineered double Pickering water-in-oil (W/O) emulsions for the first time. This patented technology by this group of researchers show that a complex formed at the interface between Pickering polyphenol crystals adsorbing from the oil side and whey protein microgel particles co-adsorbing from the aqueous side of the interface can allow the creation of stable water droplets and improve the water volume fraction in an oil-continuous matrix. This has future prospects in food and allied soft matter applications. Check out this open access [paper](#) published in Langmuir.

*Written by Dr Anwesha Sarkar*

## Outreach: Partnership Project

SOFI students in Leeds have received a Royal Society grant to organise and run an outreach project in partnership with Kettlethorpe High School in Wakefield. The project is on animal products in food and whether they can be replaced, organised by Rashmi Seneviratne. With the help of Cohort 5 volunteers, three topics are being run over the 9 week project, with Holly Linford's sessions focussing on jelly, Adam O'Connell's on cheese and Zachary Gradwell's on ice cream.

*Written by Rashmi Seneviratne*



*Jordan (Cohort 5) explaining science to keen young scientists.*

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