

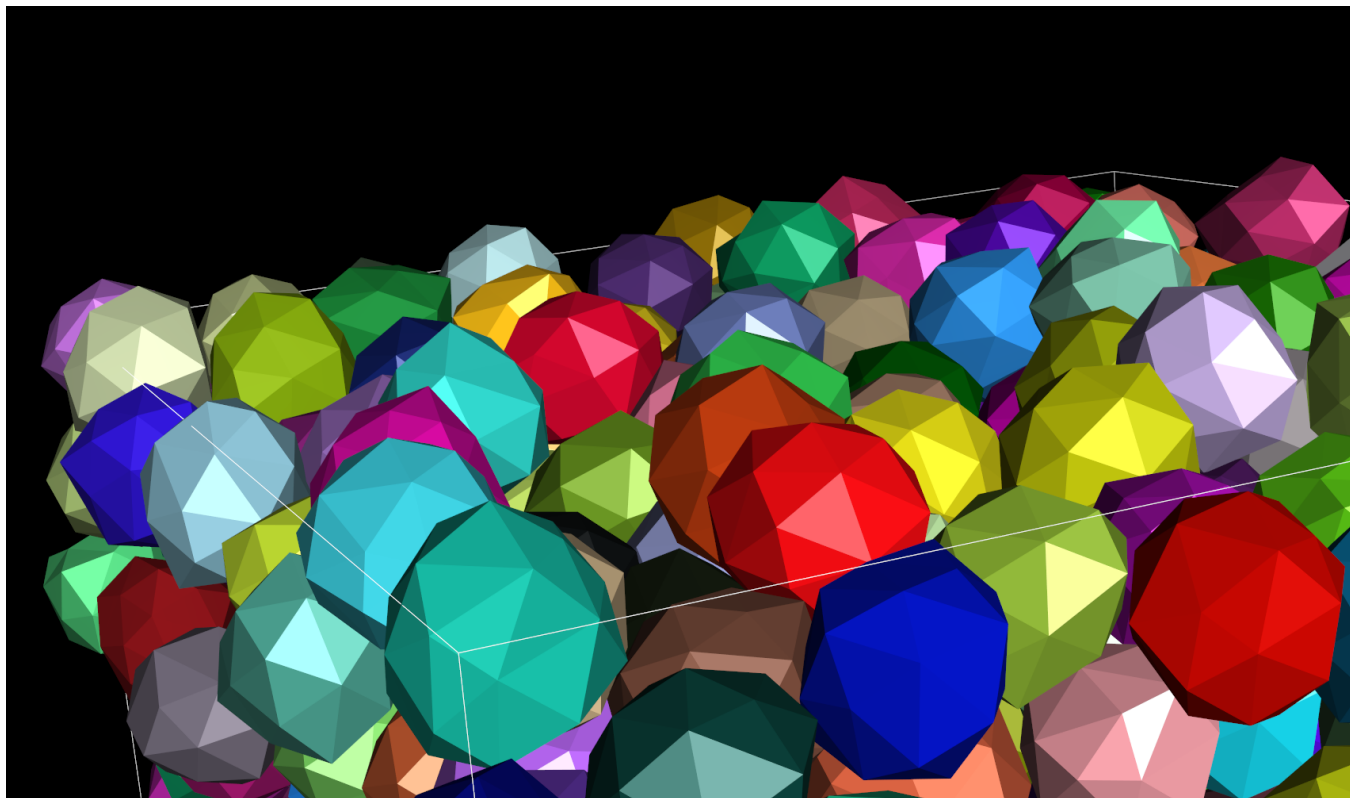


SOFI

CDT NEWSLETTER

EPSRC Centre for Doctoral Training in
Soft Matter and Functional Interfaces

July 2018



Simulation of colloidal particles

Above is an image from a simulation performed with FFEA (Fluctuating Finite Element Analysis) of soft, deformable and compressible colloidal particles self-diffusing in a highly packed environment. These particles can move and rearrange in a way that hard particles cannot. This image was kindly supplied by Tom Ridley (Cohort 2) University of Leeds.

News from the Management Board: SOFI² has got through the first stage of applying for further funding!

UK Soft Matter Showcase

The [3rd Soft Matter Showcase Conference](#), organized and hosted by the EPSRC SOFI CDT, was held at the beginning of July in Edinburgh. Over the course of two days, we had the pleasure of hearing about some excellent science.

Many of the presentations and posters were delivered by SOFI CDT students and academics, including mesmerizing videos shown by Prof Colin Bain, who demonstrated that there's nothing boring about watching ink dry. Also included in the program was a series of keynote talks from invited speakers from a bit further south, including Prof Alex Routh from the University of Cambridge, and even further south, with Dr Stuart Prescott all the way from UNSW Sydney!

To make the event even more memorable, the conference concluded with a banquet in the exquisite Balmoral Hotel. Below is a picture of some of Cohort 1 looking really pleased after the dinner.



Industry day

The Industry Day, held on the Friday following the showcase, was a great chance for individuals from industry to engage with SOFI students and academics. Industrial partners were able to hear more about what SOFI CDT has to offer, perhaps inspiring future projects and collaborations.

We were fortunate enough to hear from Dr Sam Olof, Technical Director at OxSyBio and visiting scientist in Chemical Biology at the University of Oxford. He presented his work in self-assembled artificial cells with advanced microscopy techniques and 3D printing of artificial tissues.

As in previous years, after the talks and to make the most of the visiting speakers there was the possibility of requesting one to one meetings. After lunch, there was also a horizon scanning group activity in which students, academics and industry partners discussed together a range of questions.

New stage for Cohort 4

So far so good. Peers from cohort 4 are now getting used to their new location and projects. Just wanted to make sure you all know where to find them and go and grab a coffee if you have not met with them yet.

Durham University:

- **Colin Gibson** – Migration and Adsorption of Melt Additives to Polymer Surfaces; supervised by Dr Richard Thompson and Prof Mark Wilson. Co-funded by P&G.
- **Jack Williamson** – Synthesis and materials properties of charged, stimuli responsive liquid crystals; supervised by Dr Paul McGonigal.
- **Luke Chambers** – Understanding Lactam-Active Ingredient Co-phases; supervised by Prof Jonathan W. Steed. Co-funded by Ashland.
- **Matthew Litwinowicz** – Molecular migration in Polymer Matrices supervised by Dr Richard Thompson and Prof Mark Wilson. Co-funded by AkzoNobel.
- **Rachel Goodband** – Bio-mimetic polymeric membranes; supervised by Dr Margarita Staykova, Prof Colin Bain and Dr Paul Beales.
- **Richard Chilvers** – PolyNanoCat – Tailored Polymers for Heterogeneous Transition Metal Catalyst Assembly; supervised by Dr Phil Dyer, Dr Simon Beaumont and Prof Lian Hutchings.
- **Sarah Goodband** – Harnessing Surface roughness and Ionic Effects for Liquid Repellent Surfaces; supervised by Dr Kislou Voitchovsky and Dr Halim Kusumaatmaja. Co-funded by AkzoNobel.

University of Edinburgh:

- **Carmen Morcillo Pérez** – Complex Formulations Drying on Complex Substrates - How 'Coffee' Dries on Plant Leaves; supervised by Dr Job Thijssen and Dr Tiffany Wood.
- **Hannah Jones** – Polymer Nanocomposites: tailoring thermomechanical properties; supervised by Prof Vasileios Koutsos. With in-kind support from Impact Solutions.
- **Nia Verdon** – Bacteria in droplets: microfluidics to formulation; supervised by Dr Rosalind Allen, Dr Simon Titmuss and Dr Alex Lips.
- **Ryan Jackson** – Forensic soft matter science; supervised by Prof Wilson Poon. Co-funded by The Leverhulme Research Centre for Forensic Science, University of Dundee.

Continues...

SOFI Out and About

SOFI students have once again been travelling across the world presenting their research. Here are just a few conferences in which SOFI students have participated during the last few months. Click in the links for more information.

Weybridge: Ethan Miller, David Crosby and Denise Li attended the [GSK PhD Science Symposium](#), as shown in the photo. Congratulations to David for winning the pitch to panel workshop and Denise for winning oral presentation prize. **Granada:** Jessica Andrews, Lorenzo Metilli and Luke Chambers jetted off to sunny Spain for the [International School of Crystallisation 2018](#) and presented their posters. **Venice:** Phil Hope and Kasid Khan went to Italy for the [Multivelency, from Concepts to Applications in Chemistry & Biology](#) at the Università degli Studi di Padova. **Oxfordshire:** Rashmi Seneveratne attended the [Small Angle Scattering Training School](#) at Diamond. **Pennsylvania:** June saw Laura Sawiak flying to Penn State for the [92nd ACS symposium on Colloid and Surface Science](#) where she gave a talk presenting her recently published work in [Frontiers in Chemical Engineering](#). **Bristol:** Adam O'Connell, Carmen Morcillo Perez, Jason Klebes, Sam Stublely and Tom Ridley participated in the [Advanced School in Liquids and Complex Fluids: Solutions in Spring](#). **Sorrento:** The [Annual European Rheology Conference 2018](#) had lots of SOFI Students and staff present. Ben Robertson and Rahul Chacko from Cohort 1 as well as Hugh Barlow and Tom Ridley from Cohort 2 all gave talks.



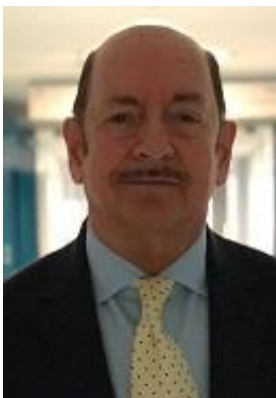
Continuation...

University of Leeds:

- **Adam O'Connell** – Micro-rheology of microscopically phase separated hydrogels; supervised by Dr Johan Mattsson and Dr Mike. Co-funded by Unilever.
- **Holly Linford** – Advanced analytics for food nanostructure determination; supervised by Dr Simon Connell, Dr Johan Mattsson and Dr Caroline Orfila. Co-funded by PepsiCo International.
- **Jason Klebes** – Organization of colloids on droplet surfaces; supervised by Dr Paul Clegg and Dr Mike Evans.
- **Lorenzo Metilli** – Application of process analytical technology (PAT) tools for monitoring and real time control over lipid crystallization under dynamic conditions; supervised by Dr Elena Simone and Prof Malcolm Povey. Co-funded by Nestlé.
- **Sam Stublely** – Understanding and controlling the behaviour of concentrated microgel dispersions; supervised by Brent Murray and Olivier Cayre. University of Leeds. Co-funded by Nestlé.
- **Zachary Gradwell** – Bistable Liquid Crystal Lenses; supervised by Prof Helen Gleeson, Dr Mamatha Nagaraj and Prof Cliff Jones. Co-funded by Merck.

SOFI Staff Profile: Dr David King

"I am delighted to be part of the Chemistry Department at Durham University and welcome the opportunity to demonstrate my research and entrepreneurial background skills, dedication and enthusiasm to be used for the benefit of student research and innovation. I am confident that my style of hands on approach, communication, knowledge and directive skills will be positive assets for the real-world translation of scientific endeavours and provide the opportunity to build long-term links of industrial research and business in universities"



Dr David King is the Royal Society's Entrepreneur in Residence at Durham University. Educated in the UK and USA he holds a PhD in polymer chemistry and an MBA from Harvard Business School. He is a highly experienced business executive and entrepreneur with an outstanding track record in product and process development, manufacturing, and business development. He spent over 35 years in the USA in executive level roles with major chemical and petrochemical companies including Exxon Mobil. David's areas of expertise include research and development, business and marketing development, manufacturing and process improvements, plant start-ups, business incubators and business start-up, licensing, JV's and alliances. He also possesses a significant concept to commercialization track record in a range of next generation polymer products and processes.

Tom Ridley

Hi, I'm Tom from Cohort 2. I did my undergraduate Degree in Theoretical Physics at Leeds, then followed that up by going on a grad scheme



for 2 years with an IT Services company. Needless to say, that wasn't making my brain hurt the way I'd like, so I decided to come back to science. I'm now working with Oliver Harlen, Daniel Read and Johan Mattsson on using a simulation method called Fluctuating Finite Element Analysis, developed at Leeds, to look at whether deformable models of soft colloids have differing dynamics from simpler soft spherically symmetric potentials and hard sphere models. In my spare time I like to run, and also play video games.

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) for further information.

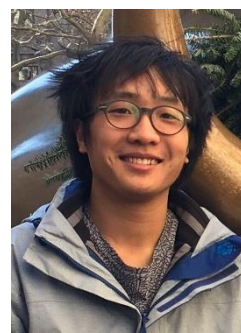
Soft Ball

It is becoming a tradition that Soft Matter Scientists dress up and celebrate with a ball. Last year it was held in Durham and this year in a surprisingly sunny Edinburgh. After a very busy day with industry we were treated to a delightful three course meal in the Royal Scots Club followed up with DJ entertainment. No need to say that we are all already looking forward to next time in Leeds but more important need to thank David Crosby for the brilliant organization, it was a complete success!



Yujie Jiang

Hi my name is Yujie Jiang. I graduated from Fudan University with a degree in physics in 2016, I then joined the SOFI cohort 3. My final year project was about



the cornstarch shear-thickening, and this was also my first time to learn about soft matter. Now I'm also doing a project weakly relating to shear thickening.

Currently I am based in the University of Edinburgh, supervised by Prof Wilson Poon and Dr John Royer, Dr Louise Bailey and Dr Andrew Clerk from Schlumberger. My project aims to develop a model binary suspension containing both repulsive and attractive particles, and understand how its rheology relates with microstructure. With the help of rheo-confocal techniques here, I've got some nice progresses so far.

I'm loving everything in Edinburgh, except the weather.



See above some pictures of the Soft Ball, Cohort 4 (top left), Cohort 3 (bottom left) and Cohort 2 (right).

1st Annual Inter-CDT Formulation and Soft Matter Summer Forum

SOFI CDT and Formulations Engineering CDT held an inter-CDT conference at Birmingham university, hoping to find common ground in which to exchange ideas and collaborate in future work. Formulation engineering tackles industry-based production problems and can be seen as the next step on from the SOFI CDT's more fundamental work. SOFI students learnt about industrial processes, such as the acoustic properties of fish batter and industrial cleaning using jets. SOFI showed the formulation CDT, amongst other things, muscle adhesive properties and lipid bilayer interactions with humectants. The event was well represented with SOFI students, with Denise Li winning one of the presentation prizes and Natasha Rigby and Daniel Day winning two of the poster prizes. The conference also included dinner at the Hilton Hotel, a science pub quiz and poster session. A big thank-you to Denise (Cohort 1), Sophie (Cohort 3) and Lia, Amy and Emily from the University of Birmingham for organising this fantastic student-led conference!

Next year Durham will be hosting the inter-CDT conference and in the spirit of interdisciplinary collaboration everyone is encouraged to attend. Details will follow in due course from the organisers, Rachel Goodband, Sarah Goodband and Natasha Rigby.



Check us out

Take a look at some of the new papers our SOFI students have published in the last few months...

- [Shear reversal in dense suspensions: the challenge to fabric evolution models from simulation data](#), Chacko R. N., Romain Mari (a2), Suzanne M. Fielding (a1) and Michael E. Cates, *Journal of Fluid Mechanics*, **2018**.
- [Mixing Time, Inversion and Multiple Emulsion Formation in a Limonene and Water Pickering Emulsion](#) Sawiak, L.; Bailes, K.; Harbottle, D.; Clegg, P.S. *Frontiers in Chemistry*, **2018**.
- [Nucleation on a sphere: the roles of curvature, confinement and ensemble](#). Law, J.O.; Wong, A.G.; Kusumaatmaja, H.; Miller, M.A. *Molecular Physics*, **2018**.
- [Dynamic Morphologies and Stability of Droplet Interface Bilayers](#). Guiselin, B.; Law, J.O.; Chakrabarti, B.; Kusumaatmaja, H. *Physical Review Letters*, 120, 238001, **2018**.

Keep up with all the SOFI news online, find us on:



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Feedback and submissions for future issues welcome!
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