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Employment

2015- Jul-Nov 2011	University of Bristol, UK Materials Nanoarchitectonics World Premier Institute, Tsukuba, Japan.	Physics-Chemistry Promotion to Reader International Centre for Young Scientists (Joint appointment with University of Bristol)
2009-		Permanent appointment to Lecturer at URF end
2007-	University of Bristol, UK	Royal Society University Research Fellow
2004- 2006	University of Tokyo, Japan	JSPS fellow , with Prof Hajime Tanaka. “Real space analysis of colloidal phase separation”.
2002- 2004	University of Utrecht, Netherlands	Postdoctoral fellow , with Prof Alfons van Blaaderen. Phase behaviour of colloids.
2001-2	UBS Warburg, London	Investment Banking ,. Marketing/developmental role in quantitative analysis group CreditDelta.

Education

1997- 2001	University of Cambridge, (St Catharine’s College)	PhD in Physics , with Prof Athene Donald, Polymers and Colloids Group. Graduated 12th May 2001.
1996-7	Gap Year	Long-distance sailing trip, England to the Caribbean.
1992-6	University of Edinburgh	BSc in Physics , 1 st class honours, Graduated 10 th July 1996.

Publications. h-index 27. 3334 citations (Google Scholar). *Highlights:*

‘Complex Plasmas and Colloidal Dispersions: Particle-resolved Studies of Classical Liquids and Solids’, Ivlev A, Loewen, H, Morfill G and Royall CP. World Scientific. (2012).

Taffs J and Royall CP “The role of fivefold symmetry in suppressing crystallisation”, *Nature Comms* **7** 13225 (2016).

Williams I, Oguz EC, Speck T, Bartlett P, Loewen H and Royall CP “Transmission of torque at the nanoscale”, *Nature Physics* **12** 98–103 (2016).

Dunleavy AJ, Wiesner K, Yamamoto R and Royall, CP “Mutual information reveals multiple structural relaxation mechanisms in a model glassformer”, *Nature Comms*, **6** 6089 (2015).

Williams I, Oguz EC, Bartlett P, Loewen H and Royall CP “Direct measurement of osmotic pressure via adaptive confinement of quasi hard disc colloids”, *Nature Comms*. **4**, 2555, (2013).

Royall CP, Williams SR, Ohtsuka, T and Tanaka H, ‘Direct observation of a local structural mechanism for dynamic arrest’, *Nature Materials* **7**, 556-561, (2008).

Royall CP, Aarts DGAL, and Tanaka H ‘Bridging length scales in colloidal liquids and interfaces from near-critical divergence to single particles’, *Nature Physics* **3**, 636-640, (2007).

Leunissen ME, Christova CG, Hyninnen A-P, Royall CP, Campbell AI, Imhof A, Dijkstra M, van Roij R and van Blaaderen A, ‘Ionic colloidal crystals of oppositely charged particles’, *Nature* **437**, 235 (2005).

Grants and Awards

Total grant income is GBP 3.34 M of which GBP 2.96 M as PI. *Highlights:*

- ERC Consolidator Grant “Nano-PRS”. EUR 1.8M
- EPSRC Responsive Mode Grant “New Frontiers in Aerosol Measurements”. GBP 334,646. Co-I with Prof. Jonathan Reid, Chemistry.
- EPSRC first grant GBP 125k.
- Royal Society URF ‘Direct observation of surface melting’. GBP 768k
- Japan Society for the Promotion of Science (JSPS), Invitational fellowship. GBP 40k
- JSPS Postdoctoral Fellowship. GBP 80k.

Organisation of conferences, workshops and symposia

- Unifying Concepts in Glass Physics VII. UK. June 2017. Lead organiser. 120 Participants.
- Centre Européen de Calcul Atomique et Moléculaire (CECAM) flagship meeting “The role of local structure in dynamical arrest”, 50 Participants. Jul 2015, Mainz, Germany.
- “Arrested gels : structure and dynamics”, 100 participants. March 2015. Cambridge.
- “Physics of Structural and Dynamical Hierarchy in Soft Matter”, March 2015. International organizer. 200 participants. Tokyo.
- CECAM international meeting “The role of interfaces in crystallisation”, May 2013, 50 Participants. Lausanne, Switzerland.
- CECAM international meeting entitled ‘Crystallisation: from colloids to pharmaceuticals’. 50 participants. July 2010.
- I have initiated a 2-day annual Soft Matter workshop with workers across the field from Physics and Chemistry in Bristol, with contributions from Bath and international speakers from across Europe and the US. www.chm.bris.ac.uk/pt/paddy/workshop.html.

Promotion of Soft Matter Research

- Total: 105 talks, of which 81 were international and 81 invited, including two public lectures.
- Public lecture at the University of Cambridge. Nov 2008
- Press: “Is glass a true solid?” www.bristol.ac.uk/news/2015/january/glass-a-true-solid.html
“Squeezing in the microdomain” www.bristol.ac.uk/news/2013/9822.html
“A new way of making glass” www.bris.ac.uk/news/2012/8866.html
“A breakthrough in glass” www.bristol.ac.uk/news/2008/212017945385.html

Partnerships with Industry

- Funding for 2 PhD students from Bayer Cropscience. Publication in *Soft Matter* in 2013.
- Collaboration with Kodak UK in Cambridge, developing principles underlying novel display technologies, resulting in publication in *J. Chem. Phys.* in 2009.
- Latex imaging with ICI-Crosfield Group, Warrington, UK, 1997-2001.

Teaching

- Fellow of the Higher Education Academy (2015)
- Lecturing 4th year undergraduate Soft Matter course
- Lecturing 3rd year NanoPhysics course
- Lecturing 2nd year undergraduate course in Statistical Mechanics
- Lecturing complexity science graduate school on liquid state theory and glass transition
- Supervising PhD, Masters’ and final year undergraduate students’ research projects.

Publication list

Authored Book

'*Complex Plasmas and Colloidal Dispersions: Particle-resolved Studies of Classical Liquids and Solids*', Ivlev A, Loewen, H, Morfill G and Royall CP. World Scientific. (2012).

Review Articles (refereed)

[78] Royall CP and Williams SR "The role of structure in dynamical arrest", *Phys. Rep.* **560** 1-75 (2015).

[77] Royall CP, Poon WCK, and Weeks ER, 'In search of colloidal hard spheres', *Soft Matter* **9** 17 - 27 (2013).

[76] Poon WCKP, Weeks ER and Royall CP, 'On measuring colloidal volume fractions', *Soft Matter* **8** 21-30 (2012).

[75] Donald AM, He CB, Royall CP, *et al.*, 'Applications of environmental scanning electron microscopy to colloidal aggregation and film formation' *Colloid Surface A* **174** (1-2): 37-53 (2000).

Chapters in Edited Books

[74] Royall CP, Malins A, Dunleavy AJ, Pinney R "Geometric frustration is strong in model fragile glassformers", in "Fragility of Glassforming Liquids", Eds : Greer AL, Kelton KF and Sastry S. Hindustan Book Agency, New Delhi, India 2014.

Preprints

[74] Rios de Anda, I, Tuci F, Sear R, Royall CP, "Long-Lived Non-Equilibrium Interstitial-Solid-Solutions in Binary Mixtures", *ArXiv*, 1702.05438 (2017).

[73] Royall CP, Williams SR and Tanaka H, "The nature of the glass and gel transitions in sticky spheres" *ArXiv*, 1409.5469 (2014).

Academic Journal Papers

[72] Pinchaipat R, Campo M, Turci F, Hallet JE, Speck T, and Royall CP, “Experimental Evidence for a Structural-Dynamical Transition in Trajectory Space” *accepted in Phys. Rev. Lett.* online at *ArXiv*, 1609.00327 (2016).

[71] Turci F, Royall CP, and Speck T, “Non-Equilibrium Phase Transition in an Atomistic Glassformer: the Connection to Thermodynamics” *accepted in Phys. Rev. X*, online at *ArXiv*, 1603.06892 (2016).

[70] Razali A, Fullerton CJ, Turci F, Hallet JE, Jack RL and Royall CP “Effects of vertical confinement on gelation and sedimentation of colloids”, *Soft Matter* **13** 3230-3239 (2017).

[69] Turci F, Tarjus G, and Royall CP “From glass formation to icosahedral ordering by curving three-dimensional space” *Phys. Rev. Lett.* **118** 215501 (2017).

[68] Meissner M, Dong J, Eggers J, Seddon AM, and Royall CP, “Oil-in-water microfluidics on the colloidal scale: new routes to self-assembly and glassy packings”, *Soft Matter* **13** 788-794 (2017).

[67] Griffiths S, Turci F and Royall CP “Local structure of percolating gels at very low volume fractions”, *J. Chem. Phys.* **146** 014905 (2017).

[66] Royall CP and Kob W. “Locally favoured structures and dynamic length scales in a simple glass-former” *J. Stat. Mech: Theory and Experiment* 024001 (2016).

[65] Pinney R, Liverpool, T and Royall CP, “Structure in Sheared Supercooled Liquids: Dynamical Rearrangements of an Effective System of Icosahedra”, *J. Chem. Phys.* **143** 244507 (2016).

[64] Taffs J and Royall CP “The role of fivefold symmetry in suppressing crystallisation”, *Nature Communications.* **7** 13225 (2016).

[63] Dougan N, Crowther P, Royall CP and Turci F “Controlling local order of athermal self-propelled particles” *J. Stat. Mech: Theory and Experiment* 124001 (2016).

[62] Turci F and Royall CP, “Crystallisation driven by sedimentation: a particle resolved study” *J. Stat. Mech: Theory and Experiment* **8** 084004 (2016).

[61] Statt A, Pinchaipat R, Turci F, Evans R, and Royall CP “Direct observation in 3d of structural crossover in binary hard sphere mixtures” *J. Chem. Phys.* **144** 144506 (2016).

Academic Journal Papers (continued)

[60] Bzdek BR, Power RM, Simpson SH, Reid JP and Royall CP “Precise, contactless measurements of the surface tension of picolitre aerosol droplets” *Chem. Sci.* **7** 274 (2016).

[59] Williams I, Oguz EC, Speck T, Bartlett P, Loewen H and Royall CP “Transmission of torque at the nanoscale”, *Nature Physics*. **12** 98–103 (2016).

[58] Pinney R, Liverpool T and Royall CP “Recasting a model atomic glassformer as a system of Icosahedra”, *J. Chem. Phys.* **143** 244507 (2015).

[57] Royall CP, Eggers J, Furukawa A and Tanaka H, “Probing Colloidal Gels at Multiple Length Scales: The Role of Hydrodynamics” *Phys. Rev. Lett.* **114** 258302 (2015).

[56] Dunleavy AJ, Wiesner K, Yamamoto R and Royall CP “Mutual information reveals multiple structural relaxation mechanisms in a model glassformer”, *Nature Communications*, **6** 6089 (2015).

[55] Crowther P, Turci F and Royall CP “The nature of geometric frustration in the Kob-Andersen mixture”, *J. Chem. Phys.* **143** 044503 (2015).

[54] Gray AT, Mould E, Royall CP and Williams I “Structural characterisation of polycrystalline colloidal monolayers in the presence of aspherical impurities”, *J. Phys.: Condens. Matter* **27** 194108 (2015).

[53] Tamborini E, Royall CP and Cicuta P “Correlation between crystalline order and vitrification in colloidal monolayers”, *J. Phys.: Condens. Matter* **27** 194124 (2015).

[52] Rios de Anda I, Statt A, Turci F and Royall CP “Low-density crystals in charged colloids : Comparison with Yukawa theory”, *Contributions to Plasma Physics*, **55** 172-179 (2015)

[51] Williams I, Oguz EC, Bartlett P, Loewen H and Royall CP “Flexible confinement leads to multiple relaxation regimes in glassy colloidal liquids”, *J. Chem. Phys.* **142** 024505 (2015).

[50] Royall CP, Malins A, Dunleavy AJ, Pinney R “Strong geometric frustration in model glassformers”, *J. Non-Cryst. Solids*, **407** 34–43 (2015).

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[49] Jack RL, Dunleavy AJ and Royall CP “Information-theoretic measurements of coupling between structure and dynamics in glass formers”, *Phys. Rev. Lett.* **113** 095703 (2014).

[48] Williams I, Oguz EC, Jack RL, Bartlett P, Loewen H and Royall CP “The effect of boundary adaptivity on hexagonal ordering and bistability in circularly confined quasi hard discs”, *J. Chem. Phys.* **140** 104907 (2014).

[47] Williams I, Oguz EC, Bartlett P, Loewen H and Royall CP “Direct measurement of osmotic pressure via adaptive confinement of quasi hard disc colloids”, *Nature Communications* **4** 2555 (2013).

[46] Malins A, Williams SR, Eggers J and Royall CP "Identification of Structure in Condensed Matter with the Topological Cluster Classification", *J. Chem. Phys.* **139** 234506 (2013).

[45] Malins A, Eggers J and Royall CP "Investigating Isomorphs with the Topological Cluster Classification", *J. Chem. Phys.* **139** 234505 (2013).

[44] Malins A, Eggers J, Tanaka H and Royall CP "Lifetimes and Lengthscales of Structural Motifs in a Model Glassformer" *Faraday Discussions* **167** 405-423 (2013).

[43] Klix CL, Murata K, Tanaka H, Williams SR, Malins A and Royall CP "Novel kinetic trapping in charged colloidal clusters due to self-induced surface charge organization" *Scientific Reports* **3** 2072 (2013).

[42] Taffs J, Williams SW, Tanaka H and Royall CP, "Structure and kinetics in the freezing of nearly hard spheres", *Soft Matter* **9** 297 - 305 (2013).

[41] Zhang I, Royall CP, Faers MA and Bartlett P, “Phase separation dynamics in colloid-polymer mixtures: the effect of interaction range” *Soft Matter* **9** 2076-2084 (2013).

[40] Malins A, Eggers J, Royall CP, Williams SR and Tanaka H, “Identification of long-lived clusters and their link to slow dynamics in a model glass former” *J. Chem. Phys.* **138** 12A535 (2013).

[39] Dunleavy A, Wiesner K and Royall CP, "Using mutual information to measure order in model glass-formers" *Phys. Rev. E* **86** 041505 (2012).

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[38] Speck T, Malins A and Royall CP “First-Order Phase Transition in a Model Glass Former: Coupling of Local Structure and Dynamics”, *Phys. Rev. Lett.* **109** 195703 (2012).

[37] Taylor SE, Evans, R and Royall CP, “Temperature as an external field for colloid-polymer mixtures : “quenching” by heating and “melting” by cooling”, *J. Phys: Condens. Matter* **24** 464128 (2012).

[36] Royall CP and Malins A “The role of quench rate in colloidal gels” *Faraday Discussions*, **158** 301-311 (2012).

[35] Yoshizawa, K, Wakabayashi, N, Yonese M, Yamanaka J and Royall CP, “Phase separation in binary colloids with charge asymmetry” *Soft Matter* **8** 11732 (2012).

[34] Rice R, Roth R and Royall CP, ‘Polyhedral colloidal ‘rocks’: low-dimensional networks’, *Soft Matter* **8** 1163-1167 (2012).

[33] Vissers T, Rex M, Imhof, A, Loewen H, Royall CP and van Blaaderen A, ‘Lane Formation in Driven Colloidal Mixtures’, *Soft Matter* **7** 2352-2356 (2011).

[32] Malins A, Williams SR, Eggers J, Tanaka H and Royall CP ‘The effect of inter-cluster interactions on the structure of colloidal clusters’, *J. Non-crystalline solids.* **375** 760-766 (2011).

[31] Royall CP and Williams SR “C-60 : the first one-component gel?” *J. Phys. Chem. B* special issue on clusters in complex liquids **115** 7288-7293 (2011).

[30] Godogna M, Malins A, Williams SR and Royall CP ‘Local Structure of Liquid-Vapour Interfaces’, invited submission to *Mol. Phys.* special issue in honour of Prof. R Evans’ 65th Birthday, **109** 1393-1402 (2010).

[29] Taffs J, Malins A, Williams SR and Royall CP ‘The effect of attractions on the local structure of liquids and colloidal fluids’, *J. Chem. Phys.* **133** 244901 (2010).

[28] Klix CL, Royall CP and Tanaka H ‘Structural and dynamical features of multiple metastable glassy states in a colloidal system with competing interactions’, *Phys. Rev. Lett.* **104** 165702 (2010).

[27] Leocmach, M. and Royall CP and Tanaka H ‘Novel zone formation due to interplay between sedimentation and phase ordering’, *EuroPhysics Lett.* **89** 38006 (2010).

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- [26] Taffs J, Malins, A, Williams SR and Royall CP ‘A structural comparison of models of colloid-polymer mixtures’, *J. Phys:Condens. Matter* **22** 104119 (2010).
- [25] Wysocki A, Royall CP, Winkler R, Gompper G, Tanaka H, van Blaaderen A and Loewen H, ‘Multi-particle collision dynamics simulations of sedimenting colloidal dispersions in confinement’, *Faraday Discussions* **144** 245-252 (2010).
- [24] Malins A, Williams SR, Eggers J and Tanaka, H and Royall CP ‘Geometric frustration in small colloidal clusters’, *J. Phys: Condens. Matter.* **21** 425103 (2009).
- [23] Elsner N, Snoswell, DRE, Royall CP and Vincent, BV, ‘Simple models for two-dimensional tunable colloidal crystals in rotating ac electric fields” *J. Chem. Phys.* **130** 154901 (2009).
- [22] Wysocki A, Royall CP, Winkler R, Gompper G, Tanaka H, van Blaaderen A and Loewen H, ‘Direct observation of hydrodynamic instabilities in driven non-uniform colloidal dispersions’, *Soft Matter* **5** 1340-1344 (2009).
- [21] Ohtsuka T, Royall CP and Tanaka H, ‘Local structure and dynamics in colloidal fluids and gels’, *Europhys. Lett.* **84** 46002 (2008).
- [20] Schmidt M, Royall CP, van Blaaderen, A. and Dzubiella J, ‘Non-equilibrium sedimentation of colloids: Confocal microscopy and Brownian dynamics simulations’, *J. Phys:Cond. Matter* **20** 494222 (2008).
- [19] Royall CP, Vermolen, ECM, van Blaaderen, A. and Tanaka H, ‘Controlling competition between crystallisation and glass formation in binary colloids with an external field’, *J. Phys:Cond. Matter* **20** 404225 (2008).
- [18] Royall CP, Williams SR, Ohtsuka, T and Tanaka H, ‘Direct observation of a local structural mechanism for dynamic arrest’ *Nature Materials* **7**, 556-561, (2008).
- [17] Williams SR, Royall CP, and Bryant G, ‘Crystallisation of Dense Binary Hard-Sphere Mixtures with Marginal Size Ratio’ *Phys. Rev. Lett* **100** 225502 (2008).
- [16] Royall CP, Louis, AA and Tanaka H, ‘Measuring colloidal interactions with confocal microscopy’, *J. Chem. Phys.* **127** 044507 (2007).
- [15] Royall CP, Aarts DGAL, and Tanaka H ‘Bridging length scales in colloidal liquids and interfaces from near-critical divergence to single particles’, *Nature Physics* **3** 636-640 (2007).

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- [14] Royall CP, Dzubiella J, Schmidt M and van Blaaderen A, 'Nonequilibrium Sedimentation of Colloids on the Particle Scale', *Phys. Rev. Lett.* **98** 188304 (2007).
- [13] Royall CP, Leunissen ME, Hyninen A-P, Dijkstra M and van Blaaderen A 'Re-entrant melting and freezing in a model system of charged colloids', *J. Chem. Phys.* **124** 244706 (2006).
- [12] Leunissen ME, Christova CG, Hyninen A-P, Royall CP, Campbell AI, Imhof A, Dijkstra M, van Roij R and van Blaaderen A, 'Ionic colloidal crystals of oppositely charged particles', *Nature* **437** 235 (2005).
- [11] Royall CP, Aarts DGAL, Tanaka H 'Fluid structure in colloid-polymer mixtures: the competition between electrostatics and depletion', *J. Phys. Cond. Matter.* **17** S3401 (2005).
- [10] Royall CP, van Roij RHJ, van Blaaderen A, 'Extended sedimentation profiles in charged colloids: the gravitational length, entropy and electrostatics', *J. Phys. Condens. Matter.* **17** 2315-2326 (2005).
- [9] Royall CP, Leunissen ME, van Blaaderen A, 'A new colloidal model system to study long range interactions quantitatively in real space', *J. Phys Condens. Matter*, **15** S3581-S3596 (2003).
- [8] Royall CP, Donald AM, 'Surface properties and structural collapse of silica in matte water based lacquers' *Langmuir*, **18** (24) 9519-9526 (2002).
- [7] Royall CP, Donald AM, 'Structure of silica in matt water-based lacquer' *Phys. Rev. E.* **66** 021406 (2002).
- [6] Royall CP, Donald AM, 'Optimisation of environmental SEM for observation of drying in matt water based lacquers' *Scanning*, **24** (6): 301-313 (2002).
- [5] Royall CP, Thiel BL and Donald AM, 'Radiation damage of water in environmental scanning electron microscopy' *J Microscopy-Oxford* **204**: 185-195 Part 3 (2001).

Conference Contributions (refereed)

[4] Loewen H, Royall CP Ivlev, A and Morfill GE, 'Charged colloidal dispersions and their link to complex plasmas', *American Institute of Physics Conference Proceedings* **1397** 201 (2011).

[3] Royall CP, Williams SR, Ohtsuka, T and Tanaka H, 'Direct observation of low-energy clusters in a colloidal gel', *American Institute of Physics Conference Proceedings*, **982** 97 (2008).

[2] Royall CP, Donald AM 'Confocal laser scanning microscopy and environmental SEM applied to matting water-based lacquers' *Abstr Pap Am Chem S* **218**: 17-PMSE Part 2 (1999) and ACS symposium series 790 Chapter 11 (2001)

PhD thesis

[1] Royall CP, 'The behaviour of silica in matt water-based lacquers', Phd thesis, University of Cambridge (2000).