Professor Michael Allen
M.A., D.Phil.(Oxon.)

Honorary Senior Research Fellow

Area of research

Molecular simulation and theory of soft condensed matter

HH Wills Physics Laboratory,
Tyndall Avenue, Bristol BS8 1TL
(See a map)

m.p.allen@bristol.ac.uk

Summary

My interests lie in computer simulations of condensed matter systems at the molecular level, with most activity focused on liquids and liquid crystals.

Biography

I was a Lecturer, Reader, and then Professor, at Bristol from 1985 to 2001. I moved to University of Warwick, and retired in 2014, returning to Bristol. In addition to my position here, I retain Emeritus Professor status at Warwick.

Oxford University Press have published the second edition of our book ***Computer Simulation of Liquids***, Michael P. Allen and Dominic J. Tildesley, 640pp (June 2017). Paperback ISBN: 9780198803201, hardback ISBN: 9780198803195, companion website.

In 2015 I was awarded the Lennard-Jones Prize and Lectureship by the Royal Society of Chemistry Statistical Mechanics and Thermodynamics Group. The Lecture was delivered at the Thermodynamics 2015 Conference in Copenhagen, 15-18 September 2015.

From mid-March to mid-June 2017 I was a visiting professor at the Politecnico di Torino, Italy, where I gave a postgraduate course on *Computer Simulation of Complex Fluids*.

In July 2019 I was a lecturer at the CCP5 Summer School in Durham.

I am still research active, even in retirement! My interests lie in computer simulations of condensed matter systems at the molecular level, with most activity focused on liquids and liquid crystals. Here is a videolecture taken at a conference in 2010 describing some of this work. Recent research, with my student Anja Humpert, has looked at the time dependence of nematic liquid crystal director fluctuations at small wave-vector **k**. We show that the director bend fluctuation is a propagating mode, under suitable conditions. This is in contrast to the generally-accepted picture, which has been around for 40 years, in which the director modes are always believed to be overdamped. This work has appeared in Physical Review Letters.

Teaching

I have always enjoyed teaching, and in recent years have given undergraduate courses on Statistical Physics, Classical Mechanics and Relativity, and Mathematical Methods. I frequently give graduate courses on Monte Carlo and molecular dynamics, and advanced statistical mechanics. I have also been external examiner for Physics Programmes at University of Leeds (2006-2010) and University of Bath (2011-2015). My current position does not include any teaching responsibilities.

Memberships

Organisations

Interface Analysis Centre

School of Physics

Research areas

- Light and Matter: Physics at the Interface

Research groups

- Nanophotonics and Nanophysics
- Theory Group

Recent publications

- Allen, M, 2019, 'Molecular simulation of liquid crystals'. *Molecular Physics*, vol 117., pp. 2391-2417
- Humpert, A, Brown, SF & Allen, MP, 2018, 'Molecular simulations of entangled defect structures around nanoparticles in nematic liquid crystals'. *Liquid Crystals*, vol 45., pp. 59-69
- Ambler, M, Vorselaars, B, Allen, MP & Quigley, D, 2017, 'Solid–liquid interfacial free energy of ice Ih, ice Ic, and ice 0 within a mono-atomic model of water via the capillary wave method'. *Journal of Chemical Physics*.
- Rutter, GO, Brown, AH, Quigley, D, Walsh, TR & Allen, MP, 2017, 'Emergence of order in self-assembly of the intrinsically disordered biomineralisation peptide n16N'. *Molecular Simulation*., pp. 1-7
- Vorselaars, B, Ruzicka, S, Quigley, D & Allen, MP, 2017, 'Folding kinetics of a polymer (vol 14, pg 6044, 2012)'. *Physical Chemistry Chemical Physics*.
- Humpert, A, Masters, AJ & Allen, MP, 2016, 'Orientational dynamics in nematic liquid crystals'. *European Physical Journal: Special Topics*.
- Allen, MP, 2016, 'Density functional theory for chiral nematic liquid crystals'. *Molecular Physics*.
- Ilnytskyi, JM, Saphiannikova, M, Neher, D & Allen, MP, 2015, 'Computer Simulation of Side-Chain Liquid Crystal Polymer Melts and Elastomers'. in: *Liquid Crystalline Polymers: Volume 1-Structure and Chemistry*. Springer International Publishing AG, pp. 93-129
- Rutter, GO, Brown, AH, Quigley, D, Walsh, TR & Allen, MP, 2015, 'Testing the transferability of a coarse-grained model to intrinsically disordered proteins'. *Physical Chemistry Chemical Physics*, vol 17., pp. 31741-31749
- Humpert, A & Allen, M, 2015, 'Elastic constants and dynamics in nematic liquid crystals'. *Molecular Physics*, vol 113., pp. 2680-2692

View complete publications list in the University of Bristol publications system