

Research Profile

December 2021 – present – Lecturer in Natural Sciences, University of Exeter, UK

January 2018 – December 2021 – Postdoctoral Research Associate, Department of Chemical Engineering and Analytical Science (CEAS), The University of Manchester, UK

- Working with Professors Paola Carbone and Flor Siperstein, I use multiscale modelling to investigate how the nano- and meso- scale structures of soft materials affect bulk properties. Systems I have studied include how the microstructure of a surfactant system (e.g. shampoo) can affect the viscosity; and the adhesion of epoxy resins to iron oxide surfaces.
- Part of two EPSRC funded Prosperity Partnerships with industrial collaborators; The Centre in Advanced Fluid Engineering for Digital Manufacturing (CAFE4DM) and Sustainable Coatings by Rational Design (SusCoRD)).

September 2019 - Visiting researcher at Sofia University, Bulgaria (10 day stay)

- Collaboration with Professor Peter Kralchevsky and Professor Krassimir Danov, Department of Chemical and Pharmaceutical Engineering, Sofia University about surfactant theory.

August 2016 - Visiting research fellow at the University of Borås, Sweden (5 day stay)

- Collaboration with Professor Kim Bolton and Dr Abas Mohsenzadeh, Department of Engineering about semi-crystalline polymer actuators.

April 2016 – December 2017 – Postdoctoral Research Associate, Department of Chemistry, University of Cambridge, UK

- Part of the BP International Centre for Advanced Materials (BP ICAM).
- I investigated the of the solubility of asphaltenes (large polyaromatic compounds found in crude oil) using free energy calculations via Monte Carlo, Molecular dynamics and hybrid MC-MD simulations within Professor Daan Frenkel's group.
- **January 2015 - January 2016 – Postdoctoral Researcher, Swedish School of Textiles, University of Borås (Sweden)**
- Part of a collaboration between the University of Borås and the University of Skövde funded by Region Västra Götaland, "Design, textiles and sustainable development".
- Within Professor Kim Bolton's group I developed a new computational approach to investigate the molecular-level mechanism for thermal actuation observed in semi-crystalline poly(vinylidene fluoride) and polyethylene using molecular dynamics.

October 2009 – September 2013– PhD, Department of Chemistry, University of York (UK)

- EPSRC-DTA funded PhD titled "Monte Carlo simulations of confined nematic systems", supervised by Dr Martin Bates. In my PhD I developed a novel off-lattice coarse-grained model to represent liquid crystal phases to investigate confined systems such as spherical shells and droplets with handles.
- Additional courses on Advanced Materials and Commercialisation of Chemistry.

2005 - 2009 – MChem, St. Hilda's College, University of Oxford (UK)

- Master of Chemistry (Upper Second).

Grant Awards

2021 – ARCHER2 Tier-1 High Performance Computing (HPC) resources (£2,400)

- Scientific Lead and lead grant writer

2018-2019 - Cirrus (EPCC) Tier-2 High Performance Computing (HPC) resources (£15,202)

- Scientific Lead and lead grant writer

2018 - Royal Society of Chemistry Travel Grant for LGBTSeminar, University of York (£100)

2017 - BP ICAM additional continuation funding (ca. £86,000)

- 8 month continuation of position at the University of Cambridge awarded following a grant proposal.

Awards

2021 – Winner of the Lionel Shrier prize for best oral presentation by a Young Scientist at the Corrosion Science Symposium and Advances in Corrosion Protection by Organic Coatings from the UK Institute of Corrosion.

2020 – Shortlisted for FSE Better World Award Emerging Impact, The University of Manchester

2019 – Winner CEAS Social Responsibility Award (2018/2019) for Public Engagement/Widening Participation

- Awarded for increasing the visibility and participation of the LGBT+ (Lesbian, Gay, Bisexual and Trans) community in STEM (Science, technology, engineering and maths) subjects

2019 – Winner of CAFE4DM ‘Dragon’s Den’ Competition, The University of Manchester

- Competition for PDRA to pitch a proposal for a small project (up to 1 year PDRA time) to Unilever and academic representatives
- Awarded for the proposal “Investigating the refreezing of ice cream using computer simulation”

2009 – Winner of the ExxonMobil Prize for Physical and Theoretical Laboratory Undergraduate work, University of Oxford

- Awarded for overall performance over three years in physical and theoretical undergraduate laboratory course to top ~5 students.

Professional Membership

2021 – present The Royal Society of Chemistry Statistical Mechanics and Thermodynamics (SMTG) committee member

2020 – present Associate member of The European Materials Modelling Council

2019 - present Member of The Royal Society of Chemistry (Associate Member since 2006)

2018- present Member of CCP5

Technical Proficiencies

Simulation techniques

- Molecular dynamics, Monte Carlo, dissipative particle dynamics, free energy calculations

Coding and scripting Languages

- Fortran – Fluent
- Bash – Proficient
- Python – Proficient, training by University of Cambridge (2017) and MOOC (2014)
- RMake – Beginner, training by The University of Manchester (2019)

Experience with pre-existing software

- Open source simulations: LAMMPS (including additional plugins such as Plumed, PyRETIS), MCCCSTowhee, VMD, Packmol, Gromacs
- Commercial packages: Accelrys Materials Studio, NSCCS Scienomics

Continuing Professional Development (CPD) – Selected

2021– Invisible Dyslexia Training Course, The British Dyslexia Association

2021– Managing at Manchester for Researchers, The University of Manchester certified by the Institute of Leadership & Management (ILM)

2021 – The Hitchhiker’s Guide to Condensed Matter and Statistical Physics: Machine Learning for Condensed Matter, The Abdus Salam International Centre for Theoretical Physics

2020 – 2021 Leadership in Education Awards Programme (LEAP), The University of Manchester

Teaching Experience

September 2021– Fellow of Advance HE (FHEA)

October 2019-January 2020 – Teaching Internship Lecturer, The University of Manchester

Supervision/co-supervision of:

- 3 MEng research projects in Chemical Engineering (The University of Manchester).
- 2 PhD students in Chemical Engineering (The University of Manchester).
- 1 visiting PhD student in Chemistry (University of Cambridge).
- 2 BSc projects in Chemistry and Natural Sciences (University of York, University of Exeter).

August 2018 – Mentoring an A-Level student, The University of Manchester

October 2016 – December 2017 - Supervisor/tutor, University of Cambridge

- Tuition small groups (size 1-3 students) for Natural Sciences undergraduates.
- Total of ca. 15-20 students taught over two academic years on two courses; Statistical Mechanics (3rd year option course) and Theoretical techniques (3rd year mandatory course).

Outreach and community engagement activities

Invited talks

February 2022 – “Transitions in Science” LGBTQ+ History Month, PRISM Exeter

June 2021 – Being #CompChemURG: How Diversity Enriches Us, The Binding Site, A community for underrepresented groups in computational chemistry, Global launch attended by ca. 240 participants

February 2020 – Being Queer in Academia: Defying Expectations, University of Nottingham

November 2019 – Gender Diversity Day, Department of Physics & Astronomy, The University of Manchester

November 2019 – Queer in Academia, University of St Andrews

September 2019 – Diversity Challenge, Royal Institution, London

November 2018 – Trans Day of Remembrance, The University of Manchester

Media Appearances

January 2022 – LGBTQ+ ChemEs & Allies profile for the American Institute of Chemical Engineers (AIChE)

July 2021 - Blog post on successful ARCHER2 grant for The University of Manchester Research IT newsletter
<https://research-it.manchester.ac.uk/news/2021/07/30/interested-applying-time-archer2/>

June 2021 – Profile for Schools OUT UK, a UK-based charity focussing on LGBT inclusion in schools.

February 2020 – Podcast for <https://www.realscientistsnano.org/> on materials/nano science (also available on YouTube).

May 2019 – “It Gets Better” podcast with ALLOUT (LGBT network) at The University of Manchester

Online activities

June 2021 – Featuring in @QueerEngineers Twitter campaign about LGBT+ Engineers

November 2020 – Taking part in the Global Science show on Twitter talking about surfactants

February 2020 – Curating @RealSci_Nano Twitter account for one week, promoting materials/nano science.

2018-present – Article summaries on growkudos.com explaining my published research to a lay audience.

2018-present – Contributions to 500 Queer Scientists, LGBTSTEM blog and LGBTSTEM day 2019.

Other

2018-2019 – Science outreach with CAFE4DM

Demonstrating non-Newtonian fluids to school children and the general public at events such as British Science week and Science Spectacular.