Monday 27 March			
9:00 AM – 1:00 PM	**Early Career Satellite Event** **Location:** Auditorium		
1:00 PM – 2:00 PM	**Lunch** **Location:** Hall D		
2:10 PM – 2:15 PM	**Welcome:** Martin Howard **Location:** Auditorium		
2:15 PM – 3:00 PM	**Keynote I: Biophysical models for 3D epithelia in vertebrate embryonic development -** Lisa Manning, Syracuse University **Chair:** Laura Machesky | **Location:** Auditorium		
3:00 PM – 3:30 PM	**Tea and coffee break – Sponsored by Oxford Nanopore** **Location:** Hall D		
	CELL METABOLISM AND ENERGETICS **Chair:** Laura Machesky | **Location:** Auditorium	**DIFFERENTIATION AND DEVELOPMENT** **Chair:** Martin Howard | **Location:** Queens Suite	**COMPLEX SYSTEMS: CLIMATE, ECOLOGY AND EPIDEMIOLOGY** **Chair**: Andrew Turberfield | **Location:** Kings Suite
3:30 PM – 4:00 PM	**(Invited) Mitochondrial dynamics as a new mechanics-to-biology transduction module** Sirio Dupont, University of Padua	**(Invited) Navigating the Waddington Landscape: Geometric models of cell fate decisions** James Briscoe, The Francis Crick Institute	**(Invited) Using Critical Slowing Down to suggest statistical indicators of disease emergence and elimination** Louise Dyson, The University of Warwick

4:00 PM – 4:30 PM	**(Invited) Mechanosensitive polyol pathway regulates biomolecular condensates** Stéphanie Torrino, Université Côte d'Azur	**(Invited) Spermatogenesis: a paradigm of stem cell regulation** Ben Simons, University of Cambridge	**(Invited) Eco-evolutionary dynamics of fluctuating populations** Mauro Mobilia, University of Leeds
4:30 PM – 4:45 PM	**Simultaneous intracellular nanorheology and nanothermometry using diamond quantum sensing** Louise Shanahan, University of Cambridge	**Spatial mechano-transcriptomics of the early mouse embryo** Adrien Hallou, University of Cambridge	**Modelling patterns and coexistence in large ecological communities** Sandro Azaele, University of Padua
4:45 PM - 5:00 PM	**FRETzel: a new software package for single-cell glucose uptake measurements within heterogeneous populations** Adam Wollman, Newcastle University	**Folding oneself into shape: Apical actomyosin contraction is sufficient to drive a furrow-shaped buckling in a curved embryonic epithelium** Jocelyn Etienne, Liphy, CNRS - Univ Grenoble Alpes	**Structure and function of MicA, a novel ClpC adaptor for metabolic shutdown** Rivka Isaacson, King's College London
5:00 PM -5:15 PM	**Metabolism, nonequilibrium thermodynamics and system dynamics** Orkun Soyer, University of Warwick	**Feedback mechanisms for morphogen scaling and their evolution** Zena Hadjivasiliou, University College London and The Francis Crick Institute	
5:15 PM – 5:30 PM	**Modelling oscillatory dynamics in cell energy metabolism** Joe Rowland Adams, Lancaster University	**YAP levels and dynamics control cell fate and proliferation** Kirstin Meyer, University of California San Francisco	
5:30 PM – 7:30 PM	**Poster Session 1 and Exhibition – Sponsored by Beckman Coulter** **Location:** Hall D		

Tuesday 28 March			
9:00 AM – 9:45 AM	**Keynote II: Symmetry breaking and crypt morphogenesis in intestinal organoids -** Prisca Liberali, Friedrich Miescher Institute for Biomedical Research **Chair:** James Briscoe | **Location:** Auditorium		
9:45 AM – 10:15 AM	**Coffee/Tea Break** **Location:** Hall D		
	CLOCKS, TIMERS AND CELL CYCLE DYNAMICS **Chair:** James Briscoe | **Location:** Auditorium	**CANCER, DISEASE AND AGEING** **Chair:** Kevin Chalut | **Location:** Queens Suite	**IMAGING ACROSS SCALES** **Chair:** Mark Leake | **Location:** Kings Suite
10:15 AM – 10:45 AM	**(Invited) Dissecting a slow cold temperature dependent timer** Martin Howard, John Innes Centre	**(Invited) Cancers Exploit Diverse Mechanical Features of the Stroma** Erik Sahai, The Francis Crick Institute	**(Invited) Community-driven super-resolution microscopy** Dylan Owen, University of Birmingham
10:45 AM – 11:15 AM	**(Invited) On the role of cell rearrangements in pattern formation** Berta Verd, University of Oxford	**(Invited) Mechanobiology of ageing** Kevin Chalut, Altos Labs	**(Invited) Cell shape control: from molecules to cellular forces** Ruby Peters, University of Cambridge
11:15 AM – 11:30 AM	**Patterns of interdivision time correlations reveal hidden cell cycle factors** Fern Hughes, Imperial College London	**Insights into cancer from machine learning: translation to clinic** Peter Weightman, University of Liverpool	**Molecular rotors as tools to image non-classical mechanical behaviour of lipid membranes under pathogenic stress** Miguel Paez Perez, Imperial College London
11:30 AM – 11:45 AM	**The alternative sigma factor RpoD4 pulses at division, linking the clock and the cell cycle in cyanobacteria** Chao Ye, University of Warwick	**Fluctuating methylations clocks allow for the quantification of the evolutionary dynamics in blood cancers** Calum Gabbutt, Institute of Cancer Research	**A label free method to measure lipid membrane dynamics of giant unilamellar vesicles** Freya Turley, Cardiff University

11:45 AM – 12:00 PM	**Optical synchronization of synthetic genetic clocks** Roberto Di Leonardo, Sapienza University of Rome	**Far from equilibrium approach to complex neurovascular dynamics in healthy ageing and dementia** Juliane Bjerkan, Lancaster University	**PolyScope: a 3D-printed minimal microscopic system for microswimmer tracking** Wesley Shao, University of Bristol
12:00 PM – 12:15 PM	**Bilateral feedback in oscillator model is required to explain the coupling dynamics of Hes1 with the cell cycle** Andrew Rowntree, University of Manchester	**Direct observation of Shelterin dynamics and T-loop formation at telomeres** Matthew Newton, The Francis Crick Institute	**Correlative atomic force microscopy with structured illumination microscopy for the investigation of nanoscale features of tuneable bacterial outer membrane models** Ioanna Mela, University of Cambridge
12:15 PM – 1:15 PM	**Lunch and Exhibition** **Location:** Hall D		
12:30 PM – 1:15 PM	**BBS AGM** **Location:** Auditorium		
12:40 PM – 1:00 PM	**Sponsored Industry Session I** **Location:** Hall D Tweezers and single molecules: How to visualize and manipulate single biomolecules in real-time (Emma Verver, LUMICKS) Enabling Life Science Research via the Application of Photonics Technologies (Andy Keatin, HORIBA)		
1:15 PM – 2:00 PM	**Keynote III: Epithelial mechanobiology from the bottom up** - Xavier Trepat, Institute for Bioengineering of Catalonia **Chair:** Kevin Chalut | **Location:** Auditorium		

	CHROMATIN AND GENE REGULATION **Chair:** Martin Howard | **Location:** Auditorium	**PATTERNS, WAVES, TRANSPORT AND FLOWS** **Chair:** Pietro Cicuta | **Location:** Queens Suite	**ENGINEERING BIOMOLECULES, CELLS AND ORGANOIDS** **Chair:** Andrew Turberfield | **Location:** King's Suite
2:15 PM – 2:45 PM	**(Invited) Understanding the link between 3D gene structure and transcription by computer simulations** Davide Marenduzzo, University of Edinburgh	**(Invited) Algal phototaxis and the evolution of multicellularity** Ray Goldstein, University of Cambridge	**(Invited) Patterning DNA-based artificial cells with reaction-diffusion** Lorenzo Di Michele, University of Cambridge
2:45 PM – 3:15 PM	**(Invited) Mathematical modelling of transcription** Jane Mellor, University of Oxford	**(Invited) Towards controlling bacterial cell behaviours using electricity and light** Munehiro Asally, University of Warwick	**(Invited) Life-like motility in droplet systems** Nathalie Katsonis, University of Groningen
3:15 PM – 3:30 PM	**Gene silencing regulation by heterochromatin compaction** Ander Movilla Miangolarra, John Innes Centre	**Odd dynamics of living chiral crystals** Alexander Mietke, University of Bristol	**Membrane transport processes control the kinetics of enzymatic pH clock reactions confined within lipid compartments** Paul Beales, University of Leeds
3:30 PM – 3:45 PM	**Simulating 3D chromatin structure at genomic rearrangements in cancer** Chris Brackley, University of Edinburgh	**Tuneable metachronal coordination in Platynereis dumerilii larvae** Rebecca Poon, University of Exeter	**A Universal Method for Analysing Copolymer Growth** Benjamin Qureshi, Imperial College London
3:45 PM – 4:00 PM	**Atomistic simulations of supercoiled DNA under tension** Matthew Burman, University of York	**The interplay of photosynthesis and phototaxis in a model microswimmer** Stephen Williams, University of Warwick	**Bioinspired cytoskeletal active networks** Isabella Guido, University of Surrey

4:00 PM – 4:15 PM	**Single-molecule imaging of nucleosome dynamics during DNA replication** Dominika Gruszka, University of Oxford	**How precise is patterning with noisy morphogen gradients?** Roman Vetter, ETH Zürich	**Two-dimensional positioning and patterning with a molecular printer made from DNA** Rafael Carrascosa Marzo, University of Oxford
4:15 PM – 4:45 PM	**Tea/Coffee Break - Sponsored by Oxford Nanopore** **Location:** Hall D		
4:45 PM – 5:30 PM	**Keynote IV: Designing Biological Circuits for Multicullularity -** Michael Elowitz, California Institute of Technology **Chair:** Pietro Cicuta | **Location:** Auditorium		
5:30 PM – 7:30 PM	**Poster Session 2 and Exhibition – Sponsored by Lumicks** Location: Hall D		

Wednesday 29 March

9:00 AM – 9:45 AM	**The Tom McLeish Lecture - Keynote V: How would a biophysicist design a cell division machinery?** - Petra Schwille, Max Planck Institute of Biochemistry **Chair:** Olwyn Byron | **Location:** Auditorium		
9:45 AM – 10:15 AM	**Tea/Coffee Break** **Location:** Hall D		
	BIOMOLECULAR STRUCTURE, DYNAMICS AND INTERACTIONS (SPONSORED BY HORIBA) **Chair:** Olwyn Byron | **Location:** The Auditorium	**TISSUE FUNCTION, MECHANICS AND MECHANOSENSING** **Chair:** Ewa Paluch | **Location:** Queens Suite	**BIOLOGICAL CIRCUITS: FROM GENES TO NEURONS** **Chair:** James Briscoe | **Location:** King's Suite
10:15 AM – 10:45 AM	**(Invited) How do Biomolecules Walk?** Sarah Harris, University of Leeds	**(Invited) Emergence of cell tissue shape during development** Tim Saunders, University of Warwick	**(Invited) Genetic Circuits that Adapt: Design Principles and Genetic Implementation** Mustafa Khammash, ETH Zürich
10:45 AM – 11:15 AM	**(Invited) Minutes-long single molecule tracking in live bacteria reveals that molecular motor tug-of-war regulates elongasome dynamics and bacterial cell shape in Bacillus subtilis** Stuart Middlemiss, Warwick University	**(Invited) Mechanical impact of cell delamination on tissue dynamics, in developmental and tumoral contexts** Magali Suzanne, University of Toulouse IIIul	**(Invited) Mechanisms for functional noise in gene regulation** James Locke, University of Cambridge
11:15 AM – 11:30 AM	**Mechanisms of action of the DNA binding protein HU towards DNA repair and biofilm stability** Elliot Chan, University of York	**Patterns of contractility within a tissue modulate force-balance dynamics** John Robert Davis, University of Manchester	**Multiscale, dynamic and spatially-periodic coordination of gene expression in the developing spinal cord** Veronica Biga, University of Manchester

11:30 AM – 11:45 AM	**Complementary approaches to obtaining thermodynamic parameters from protein ligand systems: challenges and opportunities and a case for neutrons** Mona Sarter, ISIS Neutron and Muon Facility-STFC	**The physics of root bending under gravity** Sujit Kumar Nath, University of Leeds	**Effect propagation through gene regulatory networks** Natalia Ruzickova, Institute of Science and Technology Austria
11:45 AM – 12:00 PM	**A new twist on drug design: AdhE spirosomes as cross species anti-virulence targets** Ester Serrano, University of Glasgow	**Modelling forces in confluent cell layers** Julia M Yeomans, University of Oxford	**A dynamical systems approach to design function of gene regulatory networks** Ruben Perez-Carrasco, Imperial College London
12:00 PM – 12:15 PM	**Self-assembly and hydration of a β-hairpin through integrated small and wide-angle neutron scattering** Harrison Laurent, University of Leeds	**Revealing the missing parameters in tissue folding - Out-of-plane stresses and patterned elasticity** Steph Höhn, University of Cambridge	**Perception and propagation of activity through the cortical hierarchy is determined by neural variability** Matthias Loidolt, University College London
12:15 PM – 1:30 PM	**Lunch** Location: Hall D		
1:00 PM – 1:20 PM	**Sponsored Industry Session II** **Location:** Hall D DGE-AUC: Adapting the Power of Density Gradient Separations for In-Solution Characerization (Lutz Erhardt, Beckman Coulter) Presentation by Institute of Physics, PoLNET		
1:30 PM – 3:30 PM	**Physics of Life Roadmap Session** **Chair:** Mark Leake | **Location:** Auditorium		

3:30 PM – 4:00 PM	**Tea and Coffee Break - Sponsored by Oxford Nanopore** **Location:** Hall D		
	BIOMOLECULAR ASSEMBLIES AND CONDENSATES (SPONSORED BY HORIBA) **Chair:** Mark Leake | **Location:** The Auditorium	**EVOLUTION** **Chair:** Laura Machesky | **Location:** Queens Suite	**MACHINE LEARNING AT THE PHYSICS/BIOLOGY INTERFACE** **Chair:** Olwyn Byron | **Location:** King's Suite
4:00 PM – 4:30 PM	**(Invited) Location and concentration of aromatic-rich segments dictates the percolating inter-molecular network and viscoelastic properties of ageing condensates** Jorge Rene Espinosa, University of Cambridge	**(Invited) Does evolution have an inbuilt Occam's razor?** Ard Louis, University of Oxford	**(Invited) Challenges and advantages in the integration of computational biology and deep learning** Pietro Lio, University of Cambridge
4:30 PM – 5:00 PM	**(Invited) Multiscale modelling of liquid-like chromatin organisation** Rosana Collepardo Guevara, University of Cambridge	**(Invited) Quantitatively understand microbial community traits during evolution** Wenying Shou, University College London	**4:30 PM – 4:45 PM** **Combinatorial approaches for understanding morphogenesis in 3D embryos** Salvish Goomanee, Collège De France & CNRS
5:00 PM – 5:15 PM	**Counting the cold: do flowering plants encode winter memory with large nuclear assemblies?** Alex Payne-Dwyer, University of York	**A theory of the evolution of multi-site population resistance/rescue and how the genetic diversity of the population significantly increases its probability** Bhavin Khatri, Imperial College London	**4:45 PM – 5:00 PM** **CellPhe: a toolkit for cell phenotyping using time-lapse imaging and pattern recognition** Laura Wiggins, University of York
5:15 PM – 5:30 PM	**A model system reveals how different linker histones direct chromatin to liquid-like or fibre-like condensed states** Katherine Stott, University of Cambridge	**Phenotypic noise as an evolutionary trait in bacteriophage populations** Diana Fusco, University of Cambridge	**5:00 PM – 5:15 PM** **Probing the rules of cell coordination in live tissues by interpretable machine learning based on graph neural networks** Takaki Yamamoto, RIKEN Center for Biosystems Dynamics Research

			5:15 PM – 5:30 PM **Topic Modeling to analyze spatial transcriptomic data from Allen Human Brain Atlas** Letizia Pizzini, University of Turin and INFN
5:30 PM – 5:45 PM	**How the condensation behaviour of the RNA binding protein TDP-43 influences RNA binding and regulation** Martina Hallegger, The Francis Crick Institute	**Is the variation of intragenic DNA methylation in Arabidopsis natural populations governed by genetic or epigenetic inheritance?** Amy Briffa, John Innes Centre	**Physics-informed neural networks for solving the inverse Turing problem** Antonio Matas Gil, Imperial College London
5:45 PM – 6:00 PM	**Coarse-grained simulations of biomolecular condensates with the Martini forcefield** Chris Brasnett, University of Groningen	**Mechanical interactions affect the growth and evolution of bacterial colonies** Bartlomiej Waclaw, The University of Edinburgh/Dioscuri Centre IPC Warsaw	**Decoding cellular identities from single-cell data** Zoe Piran, The Hebrew University of Jerusalem
6:15 PM – 7: 00 PM	**Keynote VI: Super-resolution imaging of transcription in living cells** - Ibrahim Cisse, Max Planck Institute of Immunobiology and Epigenetics **Chair:** Martin Howard | **Location:** Auditorium		
7:00 PM – 7:30 PM	**Drinks Reception** **Location:** Hall D		
7:30 PM – 11:00 PM	**Conference Dinner** **Location:** Studio 1		

Thursday 30 March

	CELL MEMBRANES, CELL ARCHITECTURE AND FORCES **Chair:** Ewa Paluch | **Location: Auditorium**	**IMMUNITY, RESISTANCE AND HOST/PATHOGEN DYNAMICS** **Chair:** Pietro Cicuta | **Location:** Queens Suite	**SINGLE MOLECULE BIOLOGY** **Chair:** Mark Wallace | **Location:** King's Suite
9:00 AM – 9:30 AM	**(Invited) Control of cortical mechanics by signalling** Guillaume Charras, University College London	**(Invited) How do bacteria interact with cells?** Clare Bryant, University of Cambridge	**(Invited) Tackling Topology using TopoStats** Alice Pyne, University of Sheffield
9:30 AM -10:00 AM	**(Invited) Mechanical control of immune synapse organisation and function** Katelyn Spillane, King's College London	**(Invited) Environmental conditions define the energetics of bacterial dormancy and its antibiotic susceptibility** Teuta Plizota, University of Edinburgh	**(Invited) The NEOtrap, DyeCycling, NEO-FRET & Co: expanding the single-molecule toolbox** Sonja Schmid, Wageningen University
10:00 AM – 10:15 AM	**Friction forces determine cytoplasmic reorganization and shape changes of ascidian oocytes upon fertilization** Silvia Caballero Mancebo, University College London	**Learning the differences: a transfer-learning approach to predict antigen immunogenicity and T-cell receptor specificity** Barbara Bravi, Imperial College London	**Watching bacterial cell division one molecule at a time using vertical cells** Kevin Whitley, Newcastle University
10:15 AM – 10:30 AM	**Study of E-cadherin and actin dynamics during cell-cell adhesion using a cell - lipid bilayer assay** Sayantika Ghosh, University of Warwick	**New tools to study cell-cell interactions: Using optical tweezers and microfluidics to study malaria parasites invading human erythrocytes** Emma Jones, University of Cambridge	**Dimers are forever: single-molecule techniques shine light on single-protein exchange within synaptic complexes – a potential mechanism for long-term memory storage** Katie Morris, University of Edinburgh

10:30 AM – 10:45 AM	**Using AFM and automated image analysis to study the correlation between bacterial shape and Peptidoglycan orientation in B. subtilis** Laia Pasquina Lemonche, University of Sheffield	**Physiological dynamics of individual microbes under complex changing conditions** Somenath Bakshi, University of Cambridge	**Super-resolution single-molecule detection of biomolecules using a nanopore** Kaikai Chen, University of Chinese Academy of Sciences
10:45 AM – 11:00 AM	**Model of inverse bleb growth explains giant vacuole dynamics during cell mechanoadaptation** Andrea Cairoli, University of Cambridge	**Use of Shigella-septin interactions to explore biophysical determinants in cell-autonomous immunity** Gizem Özbaykal-Güler, The London School of Hygiene and Tropical Medicine	**Revealing the mechanism of supercoil relaxation by the Human Topoisomerase3α-RMI1-RM2 complex** Graeme King, University College London
11:00 AM – 11:30 AM	**Tea/Coffee Break - Sponsored by Oxford Nanopore** **Location:** Hall D		
11:30 AM – 12:15 PM	**Keynote VII: Our archaeal ancestry -** Buzz Baum, Laboratory for Molecular Cell Biology **Chair:** Ewa Paluch | **Location:** Auditorium		
12:15 PM – 12:30 PM	**Conclusions and close** **Chair:** Martin Howard | **Location:** Auditorium		
12:30 PM – 1:30 PM	**Lunch and depart** **Location:** Hall D		