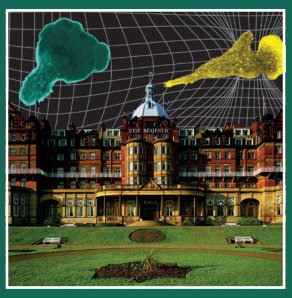
EMBO *Workshop*



Physics of Cells: From Biochemical to Mechanical (PhysCell 2018)

3–7 September 2018
The Majestic Hotel, Harrogate, UK

Programme

Monday 3 September

08:00–09:00	Breakfast *Reading and drawing room*
09:00–13:00	BIOPOL satellite meeting *Carriage Suite*
10:00–13:00	Registration *Reception Room*
13:00	Lunch *Main Dining Room*

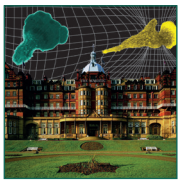
Session: Cytoskeleton
Carriage Suite

14:00	**(invited) Disassembling actin filaments with proteins and mechanical stress** Guillaume Romet-Lemonne, Institut Jacques Monod, CNRS/ University Paris Diderot, France
14:30	Questions and discussion
14:40	**(invited) A systems view on starfish surface contraction waves: from cell cycle regulation through actomyosin contractility to cytoplasmic flows** Ulrich Schwarz, Heidelberg University, Germany
15:10	Questions and discussion
15:20	**Role of the Arp2/3 complex in the architecture and propagation of actin waves** Marion Jasnin, Max Planck Institute of Biochemistry, Germany
15:40	**Controlling the machanical and biochemical properties of cell culture substrates** Pierre-Olivier Strale, Alvéole, France
15:45	Coffee break *Main Dining Room*

Session: Membranes
Carriage Suite

Biopol

16:10	**(invited) Buckling of epithelium growing under spherical confinement** Aurelien Roux, University of Geneva, Switzerland
16:40	Questions and discussion
16:50	**(invited) The OrganoPlate: Human organ-on-a-chip tissue models for predictive drug testing in any throughput** Henriette Lanz, MIMETAS, The Netherlands
17:20	Questions and discussion



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EMBO Workshop

17:30	**Cargo composition and clathrin light chains determine the mode of membrane bending by the clathrin lattice** Hannes Maib, University of Sheffield, UK
17:50	**(invited) Mechanical regulation of cell membranes revealed by model membrane systems** Margarita Staykova, Durham University, UK
18:10	Break and discussion time
19:00	Dinner *Billiard Room*

Keynote lecture
Carriage Suite

20:30	**(invited) From skin to brain, cyclic strain is a potent cue for our cells** Rudolf Merkel, Forschungszentrum Jülich, Germany

Tuesday 4 September

08:00–09:00	Breakfast *Reading and drawing room*

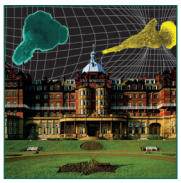
Session: Development
Carriage Suite

Biopol

9:00	**(invited) Epithelial order and planar polarity: uncoupling the coupled** David Strutt, University of Sheffield, UK
09:30	Questions and discussion
09:40	**Physical model of non-polarized cell migration during the epiboly of zebrafish embryo** Rodrigo Soto, Universidad de Chile, Chile
10:00	**Control of zippering by transient cytoskeletal scar during dorsal closure** Amélie Godeau, Centre de Regulació Genòmica (CRG), Spain
10:20	**Plasma membrane and cell surface mechanics in embryonic stem** Henry De Belly, University College London, UK
10:40	Coffee break *Main Dining Room*

Session: Nucleus
Carriage Suite

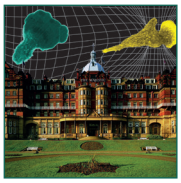
11:10	**(invited) Matrix Mechanosensing: from scaling concepts in 'Omics data to mechanisms in the nucleus and tumor heterogeneity** Dennis Discher, University of Pennsylvania, US
11:40	Questions and discussion
11:50	**(invited) Polymer choreography in the nuclear pore complex** Bart Hoogenboom, University College London, UK
12:20	Questions and discussion
12:30	**Laminar density determines formation mechanism of nuclear blebs** Dan Deviri, Weizmann Institute of Science, Israel



Physics of Cells: From Biochemical to Mechanical (PhysCell 2018)

EMBO Workshop

13:00	Lunch *Main Dining Room*
Session: Tissues *Carriage Suite*	
14:00	**(invited) Shaping cell contacts during tissue morphogenesis** Pierre-Francois Lenne, IBDM/Aix-Marseille University/CNRS, France
14:30	Questions and discussion
14:40	**(invited) Living tissues as active materials** Cristina Marchetti, Syracuse University, USA
15:10	Questions and discussion
15:20	**Polarity-induced gradients in surface tension drive the positioning of sensory hair cells to form a mirror symmetric organ** Anna Erzberger, The Rockefeller University, USA
15:40	Coffee break *Main Dining Room*
Session: Mechanical and biochemical signalling *Carriage Suite*	
16:10	**(invited) Mechanical signaling and cell fate** Kevin Chalut, University of Cambridge, UK
16:40	Questions and discussion
16:50	**Mechanical communication in cardiac cell beating and in the sensory nervous system** Shelly Tzlil, Israel Institute of Technology, Israel
17:10	**mTORC1 controls phase separation and the biophysical properties of the cytoplasm by tuning crowding** Liam Holt, New York University, USA
17:30	**Cell context-dependent CD95 activation drives apoptosis or tumorigenesis by CD95L pre-confinement** Cornelia Monzel, Heinreich-Heine University, Germany
17:50	**Flash poster talks 1** *Carriage Suite* **F.P1: Flash poster**
18:10–19:00	Break and discussion time
18:15–19:00	Committee and advisory board meeting
19:00	Dinner *Terrace*
20:30	**Poster session 1** *Main Dining Room* **P1: Poster**



Physics of Cells: From Biochemical to Mechanical (PhysCell 2018)

EMBO Workshop

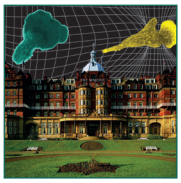
Wednesday 5 September

08:00–09:00	Breakfast *Reading and drawing room*
Session: Fibres, bundles and extracellular matrix *Carriage Suite*	
09:00	**(invited) How collections of regulatory proteins give rise to actin bundles** Jenny Gallop, The Gurdon Institute, UK
09:30	Questions and discussion
09:40	**(invited) Mechanics of biological soft matter across scales** Gijsje Koenderink, AMOLF, The Netherlands
10:10	Questions and discussion
10:20	**Mechanical interaction of cells with the fibrous non-linear elastic environment** Ayelet Lesman, Tel-Aviv University, Israel
10:40	Coffee break *Main Dining Room*
Session: Cell division *Carriage Suite*	
11:10	**(invited) Cell Division: mechanical integrity with dynamic parts** Sophie Dumont, University of California San Francisco, USA
11:40	Questions and discussion
11:50	**(invited) Active contraction or expansion of disordered cytoskeletal networks** Francois Nedelec, European Molecular Biology Laboratory, Germany
12:20	Questions and discussion
12:30	**Flash poster talks 2** *Carriage Suite*
13:00	Lunch *Main Dining Room*
14:00	Excursions
18:00	Dinner *Billiard Room*
19:30	**Poster session 2** *Main Dining Room*

physicalbiology

F.P2: Flash poster

P2: Poster

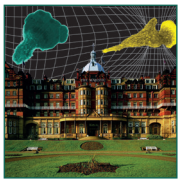


Physics of Cells: From Biochemical to Mechanical (PhysCell 2018)

EMBO Workshop

Thursday 6 September

08:00–09:00	Breakfast *Reading and drawing room*
Session: Microbes and pathogens *Carriage Suite*	
09:00	**(invited) Physical virology: unveiling self-assembly principles and mechanics of viral particles** Wouter Roos, Rijksuniversiteit Groningen, The Netherlands
09:30	Questions and discussion
09:40	**(invited) Adaptive division control and cell shape regulation in bacteria** Shiladitya Banerjee, University College London, UK
10:00	**(invited) Bacterial collective behaviour** Knut Drescher, Max Planck Institute for Terrestrial Microbiology, Germany
10:30	Questions and discussion
10:40	Coffee break *Main Dining Room*
Session: DNA/chromatin/epigenetics *Carriage Suite*	
11:10	**(invited) Single molecule manipulation and imaging of complex DNA-protein transactions** Gijs Wuite, Vrije Universiteit, The Netherlands
11:40	Questions and discussion
11:50	**(Invited) Nuclear reprogramming: a leap forward through mechanobiology** G V Shivashankar, National University of Singapore, Singapore/ FIRC Institute of Molecular Oncology (IFOM), Italy
12:20	Questions and discussion
12:30	**Sperm chemotaxis in turbulent flows** Steffen Lange, TU Dresden, Germany
13:00	Lunch *Main Dining Room*
Session: Adhesion *Carriage Suite*	
14:00	**(invited) Integrin adhesions at the crossroad between microtubules and the actomyosin cytoskeleton** Alexander Bershadsky, National University of Singapore, Singapore
14:30	Questions and discussion
14:40	**(invited) Physical effects in cell adhesion** Kheya Sengupta, Centre Interdisciplinaire de Nanoscience de Marseille, France
15:10	Questions and discussion
15:20	**Control over the mechanical interface between fibronectin and silicone elastomers regulates fibroblast adhesion and polarization** Dimitris Missirlis, Max-Planck-Institute for Medical Research, Germany



Physics of Cells: From Biochemical to Mechanical (PhysCell 2018)

EMBO Workshop

15:40	Coffee Break *Main Dining Room*

Session: Migration and microswimmers
Carriage Suite

16:10	**(invited) Oscillations in single-cell motility: simple one-dimensional models** Nir Gov, Weizmann Institute, Israel
16:40	Questions and discussion
16:50	**(invited) Exploring protein-signaling stochasticity by FRET in single cells** Tom Shimizu, AMOLF, The Netherlands
17:20	Questions and discussion
17:30	**Spiral actin waves as modulators of dendritic cells random movement** Franziska Lautenschlager, Saarland University, Germany
17:50	**Curvotaxis directs cell migration through cell-scale curvature landscapes** Laurent Pieuchot, CNRS, France
18:10	Break and Discussion time
19:00	Drinks reception and conference dinner *Main Dining Room*

Friday 7 September

08:00–09:00	Breakfast *Reading and drawing room*

Session: Protein/membrane systems
Carriage Suite

09:00	**(invited) Physics of cell adhesion: The role of the membrane in the protein recognition process** Ana-Suncana Smith, FAU Erlangen-Nürnberg, Germany and Institute Ruđer Bošković, Zagreb, Croatia
09:30	Questions and discussion
09:40	**(invited) Evolutionary self-organisation: lessons from the polarisation machinery in budding yeast** Liedewij Laan, Delft University of Technology, The Netherlands
10:10	Questions and discussion
10:20	**Phospho-regulation of Tropomyosin Cdc8 during cytokinesis is crucial for actin cable turnover in fission yeast** Darius Koester, Warwick University, UK
10:50	Coffee break *Main Dining Room*

Session: Cell mechanics
Carriage Suite

11:10	**(invited) Actin flows in cell migration: from locomotion to trajectories** Raphael Voituriez, CNRS/Sorbonne Universite, France
11:40	Questions and discussion

11:50	**Active prestress leads to an apparent stiffening of cells through geometrical effects** Elisabeth Fischer-Friedrich, TU Dresden, Germany

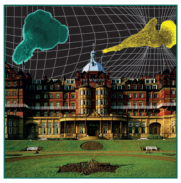
Keynote lecture
Carriage Suite

12:10	**(Invited) Polarized Cell locomotion in soft tissues mediated by microtubule actin crosstalk** Erich Sackmann, Technical University Munich, Germany
12:40	Questions and discussion
12:50	Closing remarks
13:00	Lunch and departure *Main Dining Room*

Flash Poster programme

Carriage Suite

FP.1 Tuesday 4 September		FP.2 Wednesday 5 September	
FP1.1 17:50	**Formin processivity on actin bundles** Emiko Suzuki, Institut Jacques Monod / CNRS, France	**FP2.1** 12:40	**Simultaneous cell tracking and visualization of flagellar dynamics of *Pseudomonas putida* in chemoattractant gradient** Zahra Alirezaeizanjani, Potsdam university, Germany
FP1.2 17:54	**Active torque generation by actomyosin cytoskeleton drives chiral cell-cell rearrangement** Lokesh Pimpale, TU Dresden, Germany	**FP2.2** 12:44	**Breast cancer cell migration in the bone microenvironment** Natasha Cowley, University of Sheffield, UK
FP1.3 17:58	**Cultured vs. mechanically isolated muscle cells: is there any biomechanical difference?** Karla Garcia-Pelagio, Universidad Nacional Autonoma de Mexico, Mexico	**FP2.3** 12:48	**Ligand-free EGFR activity enhances E-cadherin junction formation** Chaoyu Fu, National University of Singapore, Singapore
FP1.4 18:02	**Buckling of epithelium by apical-only actomyosin action** Jocelyn Etienne, CNRS – University Grenoble Alpes, France	**FP2.4** 12:52	**The role of tip pressure in fungal growth: mechanical and microfluidics study of *Aspergillus nidulans* and mutants** Blanca González Bermúdez, Universidad Politécnica de Madrid, Spain
FP1.5 18:06	**Traction forces mediate cell activity during cell polarization** Zeno Messi, Ecole Polytechnique Federale De Lausanne, Switzerland	**FP2.5** 12:56	**Structure and dynamics of the trypanosoma brucei plasma membrane** Marie Schwebs, University Würzburg, Germany



Physics of Cells: From Biochemical to Mechanical (PhysCell 2018)

EMBO Workshop

Poster programme

Main Dining Room

P.1 Tuesday 4 September

P1.1 Elastic properties of cytoskeletal networks in confinement and implications for mechanics of cells
Somiealo Azote, Stellenbosch University, South Africa

P1.2 Structural stability of a mitotic spindle: parametric finite element approach
Andrii Iakovliev, University of Southampton, UK

P1.3 Cell cortex structure and dynamics before, during, and after adhesion
Emmanuel Terriac, Leibniz Institute for New Materials, Germany

P1.4 Tension in the actomyosin cortex from 3D simulations
Jiri Pesek, KU Leuven, Belgium

P1.5 Actin organization in cells responding to a perforated surface, revealed by live imaging and cryo-electron tomography
Marion Jasnin, Max Planck Institute of Biochemistry, Germany

P1.6 Global turnover of contractile actin in frog egg extract
Jianguo Zhao, Georg-August-Universität Göttingen, Germany

P1.7 Investigating the collective behaviors of motor proteins pulling a cargo along cytoskeletal filaments
Naruemon Rueangkham, University of Sheffield, UK

P1.8 Modelling force generation in phagocytosis
James Bradford, University of Sheffield, UK

P1.9 Hydro-osmotic instabilities in active membrane tubes
Sami Al-Izzi, University of Warwick, UK

P1.10 The flexibility and dynamics of the tubules in the endoplasmic reticulum
Thomas Waigh, The University of Manchester, UK

P1.11 Glycosphingolipid- and lectin-dependent endocytosis studies using a chemical biology approach
Joanna Zell, Institut Curie, France

P1.12 Narrow escape: how long does it take for a camel to go through the eye of a needle?
Elisabeth Meiser, Universität Würzburg, Germany

P1.13 Membrane structural remodeling upon stress/compression
Celine Dinet, Durham University, UK

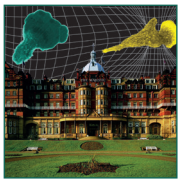
P1.14 Minimal molecular dynamics model provides insight into the connection between the structure and mechanics of ESCRT-III filaments
Lena Harker-Kirschneck, University College London, UK

P1.15 Simulation of the thermal fluctuations of red blood cells with the inclusion of hydrodynamic interactions
Thomas Hunt, University of Kent, UK

P1.16 The actomyosin cytoskeleton drives spontaneous folding of hydra fragments
Xinpeng Xu, Guangdong Technion - Israel Institute of Technology, China

P1.17 Modeling of mechanical forces during annual fish pre-epiboly and epiboly
Fernanda Pérez, Universidad de Chile, Chile

P1.18 Deformation experiments of MDCK II model tissue
Simone Gehrer, Friedrich Alexander Universität Erlangen-Nürnberg, Germany



P1.19 Curvature-dependent control of oriented epithelial tissue growth by anisotropic cell-scale topography
Pablo Rougerie, Universidade Federal do Rio de Janeiro, Brazil

P1.20 Tissue fluidity promotes epithelial wound healing
Michael Staddon, University College London, UK

P1.21 A role for autophagy in YAP/TAZ dependent tumor plasticity and somatic cell reprogramming
Qiuyu Zhuang, University of Padova, Italy

P1.22 Investigating the dynamics of apico-medial Myosin-II foci
Nilankur Dutta, Universite Grenoble Alpes, France

P1.23 Geometry and resilience of biological transport networks: Local rules for robust global transport in liver networks
Jens Karschau, TU Dresden, Germany

P1.24 High-throughput platform for rapid TEER measurement of Organ-on-a-Chip endothelial and epithelial tubules
Arnaud Nicolas, Biopol - Mimetas B.V., The Netherlands

P1.25 Interplay between tissue organisation and planar cell polarity
Sara Tan, University of Sheffield, UK

P1.26 Constricted migration increases DNA damage and independently represses cell cycle
Charlotte Pfeifer, University of Pennsylvania, USA

P1.27 The dystroglycan LINC: the functions of dystroglycan in the nuclear envelope
Ben Stevenson, University of Sheffield, UK

P1.28 The reduced approach to the stochastic modelling of cooperative Ca^{2+} release through IP_3R channels yields the global characteristics of the cell regulation
Svitlana Braichenko, University of Southampton, UK

P1.29 Role of hydrodynamic forces in beating orientation of mammalian motile cilia
Nicola Pellicciotta, Cambridge University, UK

P1.30 Deformable active nematic shells
Luuk Metselaar, Rudolf Peierls Centre for Theoretical Physics, UK

P1.31 Emergent hunting behaviors of the unicellular predator Lacrymaria encoded in coordination of its active molecular systems
Scott Coyle, Stanford University, USA

P1.32 Mechanical environment influences macrophage morphology and inflammatory response
Joan-Carles Escolano, TU Dresden, Germany

P1.33 A role for Caveolin-1 as a potential integrator of mechanoadaptive and metabolic networks in the cell
Victor Jiménez, Centro Nacional de Investigaciones Cardiovasculares Carlos III, Spain

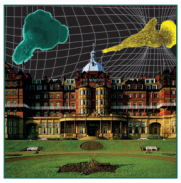
P1.34 Regulation of the Hippo pathway via the multi-PDZ domain protein MAGI-1 in epithelial cells
Claire Murzeau, The University of Sheffield, UK

P1.35 Study of the mechanical role of caveolae in 3D tumoral proliferation
Carlos Ureña Martín, Institut Curie, France

P1.36 On the thermodynamic principles of nonlinear acoustic propagation on lipid monolayers
Kevin Heeyong Kang, Technical University Dortmund, Germany

P1.37 Single-molecule biomechanics of HIV binding to broadly neutralising antibodies probed through novel integration of magnetic tweezers with digital holography
James Flewellen, The Francis Crick Institute, UK

P2.38 Nuclear mechanical issues during direct neuronal reprogramming
Marcelo Salierno, King's College London, UK



Physics of Cells: From Biochemical to Mechanical (PhysCell 2018)

EMBO Workshop

Poster programme

Main Dining Room

P.2 Wednesday 5 September

P2.1 Epithelial cell proliferation under 3D constraint
Ilaria Di Meglio, University of Geneva, Switzerland

P2.2 Directly probing how kinetochore-fibers are locally anchored in the mammalian spindl
Pooja Suresh, University of California, USA

P2.3 Modulation of APC expression in mesenchymal stem cell during nomadic culture on heterogeneous field of elasticity
Satoru Kidoaki, Kyushu University, Japan

P2.4 Structuring of the epithelial tissue
Jakov Lovrić, Ruđer Bošković Institute, Croatia/Friedrich Alexander Universität Erlangen Nürnberg, Germany

P2.5 Reconstituting *in vitro* perineuronal nets, a specialised extracellular matrix structure
Luke Souter, University of Leeds, UK

P2.6 Change in ECM composition affects sensory organ mechanics and function
Abeer Hassan, Israel Institute of Technology, Israel

P2.7 A novel mechanotransduction gene library for RNAi screening of extracellular matrix remodelling-dependent tumor Invasion
Antonio Quílez-Álvarez, Centro Nacional de Investigaciones Cardiovasculares, Spain

P2.8 Migration model of crawling cells driven by persistent fluctuation of cell shape
Hiroyuki Ebata, Kyushu University, Japan

P2.9 Cellular dynamics and cellular preferences for adhesion site geometry on two-state micropatterns
Alexandra Fink, University of Munich, Germany

P2.10 Multi geometry calibration of a cellular potts model
Sophia Schaffer, Ludwig-Maximilians-Universität München, Germany

P2.11 Mechanics of cilia beating: a relationship between metachronal wavelength and fluid flow rate
Jon Hall, University of Sheffield, UK

P2.12 Motility and waves in a hydrodynamic model of confined cell fragments
Ido Lavi, University of Barcelona, Spain

P2.13 Seawater bacteria on technical surfaces: lateral and vertical adhesion forces and nanomechanical properties
Linda Hofherr, Technische Universität Kaiserslautern, Germany

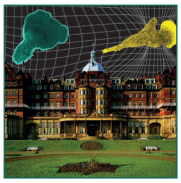
P2.14 Supported lipid bilayer platforms to study cadherin-mediated cell-cell adhesion
Feyza Nur Arslan, IST Austria, Austria

P2.15 Near real time analysis of stress fibre formation in stem cells
Lara Hauke, Georg-August-Universität Göttingen, Germany

P2.16 Actin-spectrin cytoskeleton regulates mechanical responses of neurons
Sushil Dubey, Raman Research Institute, India

P2.17 Characterization of the interactions between mesenchymal stem cells and microcarriers
Neda Davoudi, University of Kaiserslautern, Germany

P2.18 Physical model for durotaxis in non-polarized cells
Susana Márquez, Universidad de Chile, Chile



P2.19 Mechanical characterisation of the bone microenvironment by atomic force microscopy for studying breast cancer metastasis
Xinyue Chen, University of Sheffield, UK

P2.20 Cell volume modulation in response to deformations
Larisa Venkova, Institut Curie/Institut Pierre-Gilles de Gennes, France

P2.21 Levy walks in intracellular transport
Daniel Han, The University of Manchester, UK

P2.22 Elasticity threshold of the gel matrix to manipulate migration and differentiation vectors of mesenchymal stem cell
Kosuke Moriyama, Kyushu University, Japan

P2.23 Mimicking tubular environments to study epithelial sensing to curvature
Caterina Tomba, University of Geneva, Switzerland

P2.24 Biomechanics of living skin cells during wound healing and melanoma progression
Barbara Orzechowska, Institute of Nuclear Physics PAN, Poland

P2.25 Microfluidic cell deformation under inertial and shear flow conditions: probing cell structure and determining disease state
Fern Armistead, University of Leeds, UK

P2.26 Unraveling the relationship between nanoscale architecture and force generation in podosomes
Liisa Hirvonen, King's College London, UK

P2.27 Mechanical communication as a noise filter
Ido Nitsan, Israel Institute of Technology, Israel

P2.28 Advanced physical studies of cells by micropipette aspiration
Gustavo R Plaza, Universidad Politécnica de Madrid, Spain

P2.29 Actin crosslinkers and cortex tension during cell division
Neza Vadnjal, University College London, UK

P2.30 Computational study on the interplay between active tension and cortical elasticity in governing cell adhesion mechanics
Bart Smeets, KU Leuven, Belgium

P2.31 Desmoglein-3 acts as a mechanosensor in keratinocytes
Hong Wan, Queen Mary University of London, UK

P2.32 Entrainment and persistence time of beating cardiomyocytes
Ohad Cohen, Weizmann Institute of Science, Israel

P2.33 AFM-based microrheology to quantify viscoelastic properties of cells
Shada Abu Hattum, JPK instruments, Germany

P2.34 Model based estimation of the mechanical micro-environment inside tissue spheroids
Maxim Cuvelier, MeBioS, Belgium

P2.35 Exploring the mechanics of phagocytosis
Jaime Cañedo, University of Sheffield, UK

P2.36 The establishment of the patient customized in vitro platform to evaluate CAF-induced anticancer drug resistance
Jung-Yeon Yi, Ministry of Food and Drug Safety, Korea