The Cytoskeleton as Active Matter

818. WE-Heraeus-Seminar

30 Sep - 04 Oct 2024
at the Physikzentrum Bad Honnef/Germany

The WE-Heraeus Foundation supports research and education in science, especially in physics.
The Foundation is Germany's most important private institution funding physics.

WILHELM UND ELSE
HERAEUS-STIFTUNG

Program

Sunday, September 29, 2024

17:00 – 20:00	Registration	
18:20 – 19:45	*BUFFETT SUPPER / Informal get together*	
19:45 – 20:00	Scientific organizers	Opening and welcome
20:00 – 21:00	Kick-off Paul Janmey	**The Cell Nucleus as an Active Material**

Monday, September 30, 2024

08:00 – 09:00	*BREAKFAST*	
09:00 – 09:40	Andreas Bausch	**Structure formation in cytoskeletal and organoid systems**
09:40 – 09:55	Serge Dmitrieff	**Does contractile actin behave as an active gel ?**
09:55 – 10:35	Michael Murrell	**F-actin architecture determines the conversion of chemical energy into mechanical work**
10:35 – 11:00	*COFFEE BREAK*	
11:00 – 11:15	Feng-Ching Tsai	**Modulation of topological defects in actin nematics driven by non-processive myosin I motors on lipid membranes**
11:15 – 11:55	Claudia Steinem	**Impact of native-like lipid membranes on the architecture and contractility of actomyosin networks**
11:55 – 13:30	*LUNCH*	

Program

Monday, September 30, 2024

13:30 – 14:10	Laurent Blanchoin	**Reconstituting the Dynamic Steady States of Actin Networks**
14:10 – 15:05	**Poster Flash Talks I (Poster 1 – 16)**	
15:05 – 15:20	*COFFEE BREAK*	
15:20 – 16:30	**Poster Flash Talks II (Poster 17 – 33)**	
16:30 – 18:20	**Poster Session I**	
18:20 – 20:00	*DINNER*	
20:00 – 21:00	Keynote: Cécile Sykes	**Cell biophysics: phase diagrams, phase portraits and trajectories**

Program

Tuesday, October 1, 2024

08:00 – 09:00	*BREAKFAST*	
09:00 – 09:40	Karsten Kruse	**Localized States in Active Fluids**
09:40 – 09:55	Michel Riedl	**Synchronization in collectively moving inanimate and living active matter**
09:55 – 10:35	Sarah Köster	**Intermediate filaments: Shock absorbers and safety belts for the cell?**
10:35 – 11:00	*COFFEE BREAK*	
11:00 – 11:15	Pau Guillamat	**Guidance of cellular nematics into self-shaping active surfaces**
11:15 – 11:55	Amy Beedle	**Fibrillar adhesion dynamics govern the timescales of nuclear mechano-1 response via the vimentin cytoskeleton**
11:55 – 13:30	*LUNCH*	
13:30 – 14:10	Moumita Das	**Rigidity and Resilience in Active Composite Cytoskeletal Networks**
14:10 – 14:25	Kyriacos Nicolaou	**Modeling the microtubule organization in young neurons**
14:25 – 15:05	Laura Schaedel	**Microtubules: fragile, yet resilient**
15:05 – 15:20	Simon Wieland	**The role of size-dependent organelle-microtubule interactions for efficient retrograde organelle transport**
15:20 – 15:50	*COFFEE BREAK*	

Program

Tuesday, October 1, 2024

15:50 – 16:30	Dan Needleman	**Spindles as Active Matter**
16:30 – 16:45	Alexander Bershadsky	**Fibrillar adhesions: A new paradigm**
16:45 – 17:25	François Nédélec	**Simple Mechanisms for Chromosome Partitioning**
17:25 – 17:40	Daniel Härtter	**Sarcomeres as Active Matter: Stochastic Tug-of-War Among Sarcomeres Regulates Cardiomyocyte Contractions**
17:40 – 18:20	Meredith Betterton	**New mechanisms of cytoskeletal activity via unexpected protein interactions and transport along microtubules**
18:20 – 20:00	*DINNER*	
20:00 – 21:00	Keynote: Erwin Frey	**Active Supramolecular Structures: Micelles, Bilayers, and Foams**

Program

Wednesday, October 2, 2024

08:00 – 09:00	*BREAKFAST*	
09:00 – 09:40	Matthias Krüger	**Can the mean back relaxation distinguish active from passive motion?**
09:40 – 09:55	Bart Vos	**Experimentally exploiting Onsager regression in passive measurements to reveal active mechanics of living systems**
09:55 – 10:35	Ming Guo	**Cytoplasm as active matter regulating intracellular biological processes**
10:35 – 11:00	*COFFEE BREAK*	
11:00 – 11:15	Dorian Marx	**The "mechanical fingerprint" quantifies the active energy and mechanical properties of the cytoplasm**
11:15 – 11:55	Martin Lenz	**Elasticity from entanglements in branched actin**
11:55 – 13:30	*LUNCH*	
13:30 – 18:20	**Excursion**	
18:20 – 20:00	***HERAEUS DINNER at the Physikzentrum (cold and warm buffet, with complimentary drinks)***	
20:00 – 21:00	Keynote: Gijsje Koenderink	**Biological soft matter: from single cell to multicellular active behavior**

Program

Thursday, October 3, 2024

08:00 – 09:00	*BREAKFAST*	
09:00 – 09:40	Ulrich Schwarz	**Modelling active force generation in adherent cells**
09:40 – 09:55	Anna Schepers	**The actin cytoskeleton as mechanical sensor and actuator in T cell function**
09:55 – 10:35	Conrad Möckel	**Biophysical characterization of living matter at the sub-cellular level using optical microscopy**
10:35 – 11:00	*COFFEE BREAK*	
11:00 – 11:15	Johannes Rheinländer	**Measuring the interface tension of soft materials with scanning ion conductance microscopy**
11:15 – 11:55	Allen Ehrlicher	**Sensing the squeeze: nuclear YAP mechanotransduction in pathology & physiology**
11:55 – 13:30	*LUNCH*	
13:30 – 14:10	Elisabeth Fischer-Friedrich	**Twofold mechanosensitivity ensures actin cortex reinforcement upon peaks in mechanical tension**
14:10 – 14:25	Christoph Anton	**The actin cortex of cells in different adhesion states**
14:25 – 15:05	Andreas Janshoff	**Mechanical Polarity of Epithelia Cells: Role of Actin Isoforms**
15:05 – 15:20	Ana Suncana Smith	**Capturing the mechanosensitivity of cell proliferation in models of epithelium**
15:20 – 15:50	*COFFEE BREAK*	
15:50 – 18:20	**Poster Session II**	
18:20 – 20:00	*DINNER*	
20:00 – 21:00	Keynote: Fred MacKintosh	**Mechanical phase transitions and the elasticity of biopolymer matrices**

Program

Friday, October 4, 2024

08:00 – 09:00	*BREAKFAST*	
09:00 – 09:40	Joachim Rädler	**Cellular morphodynamics on microlanes - mechanistic models and simulation based inference**
09:40 – 09:55	Valentin Wössner	**Active gel model for one-dimensional cell migration coupling actin flow and adhesion dynamics**
09:55 – 10:35	Rhoda Hawkins	**Cell migration in differing environments**
10:35 – 11:00	*COFFEE BREAK*	
11:00 – 11:15	Karen Alim	**Feedback between cytoplasmic flows and cytoskeleton drive cell shape optimization**
11:15 – 11:55	Christoph Schmidt	**Mechanics of the cell wall: The compound system of actin cortex and outer membrane**
11:55 – 12:10	Scientific organizers	**Poster Awards and Concluding Remarks**
12:10 – 13:30	*LUNCH*	

End of seminar and departure