

N4M
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Nanoengineering *for* Mechanobiology

Sunday 27 th March 2022 Mechanotransduction		
15:00	Registration	
17:00	Aldo Ferrari, Massimo Vassalli	Introduction
17:15	Boris Martinac	3.8 billion years of mechanotransduction: From osmoregulation to the sense of touch
18:00	Mariana Azevedo Gonzalez Oliva	The role of Piezo1 in transducing viscoelasticity to the cell nucleus
18:30	<i>Cytosurge / Tamás Gerecsei</i>	<i>High throughput single-cell adhesion measurements enabled by fluidic force microscopy</i>
18:45	Valeria Venturini	The nucleus acts as an elastic mechanosensor to gauge physical shape deformation and control cellular behavior
19:15	Joachim Spatz	Matter to life: bottom-up assembly of synthetic cells
20:00	Welcome cocktail	

Program of the event

Monday 28 th March 2022		
Mechanochemistry / Tunable Biomaterials		
9:00	Andreas Herrmann	Controlling the activity of drugs, proteins and genes by ultrasound
9:45	Eva Carvalho	Oligodendrocytes have feelings too - A tissue engineering approach to uncover the mechanobiology of myelination
10:15	Sylvain Gabriele	Sensing the curvature: active mechanics and nuclear mechanoadaptation
10:45	Coffee Break and Poster Viewing	
11:15	Kerstin Blank	Shedding light on cell-material interactions with coiled coil-based molecular force sensors
12:00	<i>Impetux / Oriol Nos</i>	<i>Extending Optical Tweezers from Extracellular to Intracellular Cell Mechanics</i>
12:15	Lorenza Garau Paganella	3D models to investigate the biological effects of chemomechanical coupling in the dermal niche
12:45	Lunch	
13:45	Poster Session	
15:00	Robert Göstl	From force-reporting to force-resistant: using mechanochemistry to understand polymer materials
15:45	Delphine Gourdon <i>EBSA speaker</i>	3D tunable fibronectin-collagen tumour-mimicking platforms for control of cell adhesion and matrix deposition
16:15	<i>Optics11 Life / Luca Bersanini</i>	<i>High-throughput mechanical screening solutions for cells and biomaterials</i>
16:30	Arne Gennerich	Single-molecule studies of KIF1A motion and force generation
17:00	Coffee Break	
17:30	Aránzazu del Campo Bécáres	Engineered living therapeutic materials: new concepts for sustained and sustainable drug delivery
18:15	Susan Babu	Enhancing the guided growth of neurons using synthetic Anisogels
18:45	Stefan Jentsch	Drop-on-demand acoustic bioprinting from picoliter to nanoliter range avoiding wall shear stress

Tuesday 29 th March 2022		
Translation of mechanobiological insights/methods into clinical settings		
9:00	Mark Schwartzman	Nanoscale spatio-mechanical regulation of the immune signaling in cytotoxic lymphocytes
9:30	Nafsika Chala	Mechanical fingerprint of senescence in endothelial cells
10:00	Florian Friedland	Cyclic tissue strain triggers apoptotic cell extrusion in early breast gland development.
10:30	Coffee Break	
11:00	Jochen Guck	Feeling for Covid19
11:45	Seb Doherty-Boyd	Developing a synthetic bone marrow niche for hematopoietic stem cell maintenance
12:15	Patrizia Romani	Mitochondrial fission links ECM mechanotransduction to metabolic redox homeostasis and metastatic chemotherapy resistance
12:45	It's Time for Translation – Young Scientist Award presentations	
13:15	Lunch in Recco	
15:00	Visit to Genova	
20:00	Social Dinner	

Program of the event

Wednesday 30th March 2022 Mechanobiology of multicellular systems		
9:00	Sara Wickström	Regulation of cell fate and integrity by nuclear mechanotransduction
9:45	Aleksandra Kozyrina	Extracellular matrix spatial heterogeneity drives retinal epithelium mechanobiology
10:15	Rudolf Merkel	Behavior of Skin and Skin Models Under Mechanical Strain
10:45	Coffee break and Poster Viewing	
11:15	Pierre-Francois Lenne	From cell generated forces to global tissue pattern and shape (and back)
12:00	<i>Nanosurf / Gotthold Fläschner</i>	<i>New research paths open in AFM and beyond with Nanosurf CleanDrive and WaveMode</i>
12:15	Kenji Nishizawa	Shaping cell contacts by locally applied forces
12:45	Lunch	
13:45	Poster Session	
15:00	Pascal Silberzan	Active cells nematics: Architectures and flows
15:45	Pierre Ucla	Dynamics of endothelial engagement and filopodia formation in complex 3D microstructures
16:15	<i>Bruker / Heiko Haschke</i>	<i>From Single Molecule Dynamics to Automated Large Scale Mechanical Mapping – Multiparametric Microscopy Solutions from Bruker Nano Surfaces</i>
16:30	Young Choi	Use of a novel bistable stretching device for investigating acute stretch of endothelial monolayers and the effects of senescence
17:00	Coffee Break	
17:15	Daniel Müller	Quantifying individual cell membrane receptors regulating cell mass, adhesion and rheology
18:00	<i>Lumicks / Kalthoum Ben M'Barek</i>	<i>From Single-Protein to Single-Cell: a unique platform that combines optical tweezers and fluorescence microscopy for the study of Cytoskeletal Processes and Cell Mechanics</i>
18:15	Kay-Eberhard Gottschalk	Super-resolution imaging with metal-induced energy transfer reveals effect of force on the actin cytoskeleton
18:45	Sandra Citi	Cingulin tethers nonmuscle myosin 2B to ZO-1 to mechanoregulate the apicolateral membrane and the tight junction barrier

Thursday 31st March 2022 Role of mechanics in Morphogenesis		
9:00	Carl-Philipp Heisenberg	Mechanochemical feedback loops in early zebrafish embryogenesis
9:45	Elijah R Shelton	Towards mechanical stimulation of stem cell derived retinal organoids
10:15	Wolfgang Wagner	Spatial self-organization of pluripotent stem cells in colonies and aggregates
10:45	Karine Guevorkian	Mesodermal mechanics during the axial morphogenesis of chicken embryo
11:30	Anna Sternberg	The impact of mechanical forces in preparation for human embryo implantation
12:00	Closing Remarks	

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