

THURSDAY JUNE 10, 2021

9.00 – 9.10 **Welcome session: Giancarlo Forte**, FNUSA-ICRC, Czech Republic

SESSION 1: CELL MECHANICS IN DEVELOPMENT AND REGENERATION

Discussion chairs: Heinz Redl (LBI, Austria) and **Vladimír Vinarský** (FNUSA-ICRC, Czech Republic)

9:10 – 9:55 **Pere Roca-Cusachs**, IBEC, Spain

Transducing - and shielding - mechanical signals from integrins to the nucleus

9:55 – 10:25 **Diana S. Nascimento**, ICBAS/i3S/INEB, Portugal

The Yin and Yang of the cardiac extracellular matrix: from regeneration during development to repair in adulthood

10:25 – 10:55 **Giancarlo Forte**, FNUSA-ICRC, Czech Republic

New paradigms in pathological mechanosensing

10:55 – 11:10 COFFEE BREAK

11:10 – 11:40 **Guido Caluori**, LIRYC INSERM U1045, France

Methods and tools to investigate cell mechanobiology

11:40 – 12:10 **Paolo Maiuri**, IFOM, Italy

The nucleus: Polarity and Volume

12:10 – 12:55 Selected talks from abstracts (10 min + 5 min Q&A)

12:10 – 12:25 **Lina Papadimitriou**, IESL FORTH, Greece

Influence of topography of micro-patterned Si surfaces on PC12 neural cell differentiation: implication of mechanotransduction pathways

12:25 – 12:40 **Gloria Garoffolo**, CCM, Italy

Convergence of Hippo/TGF- β pathways in mechanical activation of vein aorto-coronary bypass failure

12:40 – 12:55 **Fabiana Martino**, FNUSA-ICRC, Czech Republic

hnRNPc mediates the mechanoregulation of mRNA homeostasis in heart failure

12:55 – 14:00 LUNCH BREAK

SESSION 2: MATRIX SENSING IN DEVELOPMENT AND REGENERATION

Discussion Chairs: Giancarlo Forte (FNUSA-ICRC, Czech Republic) and **Wolfgang Holthoner** (LBI, Austria)

14:00 – 14:30 **Oleg Lunov**, FZU, Czech Republic

In vitro Models for Evaluation of Drug-Induced Liver Injury: Role of Physical Factors

14:30 –15:00 **Valerio Izzi**, University of Oulu, Finland
System-level models of the expression and mutations/alterations of the tumor matrixome

15:00 – 15:15 COFFEE BREAK

15:15 – 16:00 **Sirio Dupont**, University of Padova, Italy
ECM mechanotransduction licenses an antioxidant response by regulating mitochondrial morphology and NRF2 activity

16:00 – 16:45 Selected talks from abstracts (10 min + 5 min Q&A)

16:00 – 16:15 **Andreas Traweger**, PMU, Austria
The Matricellular Protein SPARC Modulates Load-sensing in Tendons

16:15 – 16:30 **Eleftheria Babaliari**, IESL FORTH, Greece
Study of the combined effect of shear stress and laser-patterned topography on Schwann cells' behavior

16:30 – 16:45 **Jorge Oliver-De La Cruz**, FNUSA-ICRC, Czech Republic
Nucleoskeletal organization is influenced by YAP-dependent extracellular matrix rearrangement

16:45 – 18:00 Rapid-fire poster presentations (15 min each video + 10 min Q&A)

Discussion chairs: Marco Cassani, Fabiana Martino (FNUSA-ICRC, Czech Republic)

16.45-17.00 Poster session: Cell, tissue dynamics and patterning

17-10-17.25 Poster session: Materials for regeneration

17.35-17.50 Poster session: Disease Modelling (I)

[Additional information about the posters presented in each session can be found in pages 5-6.](#)

FRIDAY JUNE 11, 2021

Session 3: Matrix mimicry to foster regeneration

Discussion Chairs: **Sirio Dupont** (University of Padova, Italy) and **Soraia Fernandes** (FNUSA-ICRC, Czech Republic)

9:00 – 9:45 **Carl-Philipp Heisenberg**, IST, Austria

A mechanochemical gradient controlling robust cell internalization during zebrafish gastrulation

9:45 – 10:15 **Michael Monaghan**, TCD, Ireland

Tailoring Electroconductive Biomaterial Patches and Scaffolds to Match the Mechanical Anisotropy of Organ-specific

10:15 – 10:45 **Serena Zacchigna**, ICGEB, Italy

In vivo secretome screening identifies emid2 anti-invasive properties through modulation of tumor microenvironment

10:45 – 11:00 COFFEE BREAK

11:00 – 11:30 **Annalisa Tirella**, University of Manchester, UK)

Advanced materials to mimic biophysical properties of tissue ECM in 3D

11:30 – 12:00 **Chiara Arrigoni** (Ente Ospedaliero Cantonale, Switzerland)

3D human microvasculature on a chip identifies novel therapeutic targets challenging cancer cell extravasation

12:10 – 12:15 Selected talk from abstracts (10 min + 5 min Q&A)

12:00 – 12:15 **Cian O'Connor**, RCSI, Ireland

Development of an induced pluripotent stem cell spinal cord scaffold system to investigate and promote spinal cord repair

12:15 – 13:00 LUNCH BREAK

Session 4: Virtual hands on session

Discussion chairs: **Jorge Oliver-De La Cruz**, **Soraia Fernandes**, **Fabiana Martino** (FNUSA-ICRC, Czech Republic)

13:00 – 14:00 Virtual System Demonstration: ZEISS Lattice Lightsheet 7- Long-term Volumetric Imaging of Living Cells (detailed information found in page 8)

Moderation – Katerina Zertova

System Demonstration – Dr. Steffen Burgold

14:00 –15:00 TESCAN Amber virtual demonstration: a practical session on cellular ultrastructure investigation by advanced electron microscopy techniques (detailed information found in page 9)

System Demonstration - Dr. Jakub Javurek, Head of Applications

15:00 – 16:00 Rapid-fire poster presentations (15 min each video + 10 min Q&A)

15.00-15.20 Poster session: Disease Modelling (II)

15.30 – 15.45 Poster session: Disease Modelling (III)

15.55 – 16.10 Poster session: Cellular mechanosensing (I)

16.20 – 16.35 Poster session: Cellular mechanosensing (II)

[Additional information about the posters presented in each session can be found in pages 5-6.](#)

16:45 Final remarks

POSTER SESSIONS

THURSDAY JUNE 10, 2021

16.45-17.00 Poster session: Cell, tissue dynamics and patterning

Jaana Schneider, LBI, Austria - Cre mRNA is not transferred by EVs from endothelial and adipose-derived stromal/stem cells during vascular network formation

Martin Pesl, FNUSA-ICRC, Czech Republic - Arrhythmic events in clustered human pluripotent stem cell-derived cardiomyocytes

Nuno Neto, TCD, Ireland - Intracellular label-free detection of mesenchymal stem cell metabolism within a perivascular niche-on-a-chip

Shimaa Abdelaleem, NIMS, Japan - Impact of extracellular matrix ligand densities on TGF- β -induced EMT

Stefano Rizzi, CCM, Italy - Production of living pericardium material for personalized cardiac valve repair

17-10-17.25 Poster session: Materials for regeneration

Carolina Oliver-Urrutia, CEITEC-BUT, Czech Republic - Isolation of human oral mucosa stem cells for tissue engineering applications in combination with polyvinylpyrrolidone hydrogel

Paraskevi Kavatzikidou, FORTH, Greece - Anisotropic topography on biodegradable polymeric replicas mediate mouse stem cell focal adhesion, mechanotransduction and osteogenic differentiation

Josef Jaros, ICRC-FNUSA, Czech Republic - Creating lung tissue models utilizing 3D bioprinting

Matteo Solazzo, TCD, Ireland - Structural crystallisation of crosslinked 3D PEDOT: PSS anisotropic porous biomaterials to generate highly conductive platforms for tissue engineering applications

Phanee Manganas, IESL-FORTH, Greece - Understanding the mechanism of focal adhesion formation and intracellular signalling pathway activation on micropatterned polymeric replicas

17.35-17.50 Poster session: Disease Modelling (I)

Cristina Manfredini, IRCCS, Italy - Low-Intensity pulsed ultrasound stimulation enhances chondrogenic differentiation of ASCs in a 3D hydrogel

Sinead O'Rourke, TCD, Ireland - Inflammation in atherosclerosis: Investigating cholesterol crystals as potent drivers of M1 polarisation and metabolic reprogramming in primary human macrophages

Annalena Dittmann, University of Oulu, Finland - The Burden of Post-Translational Modification (PTM)-Disrupting Mutations in the Tumor Matrisome

Gabriele Addario, MERLN, The Netherlands - Towards a renal tubulointerstitium in vitro model

Soraia Fernandes, FNUSA-ICRC, Czech Republic - Extracellular matrix tumorigenic alterations in prostate cancer organoids

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15.00-15.30 Poster session: Disease Modelling (II)

Vladimir Vinarsky, FNUSA-ICRC, Czech Republic - YAP1 regulates cardiomyocyte contractility through regulation through LTCC channels

Federico Tidu, FNUSA-ICRC, Czech Republic - Calcineurin-NFAT signalling in human mesenchymal stromal cells drives ECM remodeling and anti-fungal response

Mattia Spedicati, Politecnico di Torino, Italy - 3D in vitro model of early-stage human cardiac fibrosis based on bioartificial scaffold

Gerardina Ruocco, Politecnico di Torino, Italia - *In vitro* engineered model of fibrotic cardiac tissue based on electrospun bioartificial scaffolds

Helen Kearney, Maastricht University, Netherlands - The effect of iPSC culture conditions prior to downstream kidney organoid differentiation

Ece Ergir, FNUSA-ICRC, Czech Republic - Generation and Characterization of Organotypic Cardiac Microtissues for Translational Research

15.30-15.50 Poster session: Disease Modelling (III)

Ana Milena Bermeo Noguera, Universidad Nacional de Colombia - Preclinical evaluation of autologous artificial connective tissue made with oral mucosa and skin fibroblasts to increase keratinized gingiva

Michele Fenu, Erasmus MC, The Netherlands - Environmental mechanical parameters influence deposition of ECM

Marek Černík, IBP, Czech Republic - Production of a microfluidic chip to study the CD44-Hippo pathway cross-talk

Meenakshi Suku, TCD, Ireland - Tuning macrophage polarization to model myocardial infarction in the generation of functional cardiac organoids

Jan Víteček, IBP, Czech Republic- Mechanobiological aspects of thrombolysis: in vitro study in vascular models

15.55 – 16.10 Poster session: Cellular mechanosensing (I)

Šimon Klimovič, CEITEC, Czech Republic - Covalently cross-linked hyaluronic acid BASED hydrogels with tunable properties for cell culturing

Stefania Pagliari, FNUSA-ICRC, Czech Republic - PSC mesoderm specification is controlled by YAP-TEAD1-driven cytoskeleton dynamics and intracellular tension

Ferran Lozano Juan, BiomimX Srl. / Politecnico di Milano, Italy - A novel heart-on-chip coupled with uniaxial mechanical stimulator and an integrated electrical reading system for drug cardiotoxicity studies

Marco Cassani, FNUSA-ICRC, Czech Republic - Toward the understanding of bio-nano interactions through mechanobiology

Jaroslav Jacak, University of Applied Sciences Upper Austria, School of Applied Health and Social Sciences, Linz- Austria- In-vitro model of the human blood vessel wall

16.20 – 16.35 Poster session: Cellular mechanosensing (II)

Tosca Roncada, University of Portsmouth, United Kingdom - Development of hybrid hydrogels for osteochondral regeneration

Jan Přebyl, CEITEC MU, Czech Republic - Cellular mechanosensing by means of atomic force microscopy

Mazaya Najmina, University of Tsukuba, Japan - Material Fluidity Promotes the Senescence of Breast Cancer Cells in a Fluidity-dependent Manner

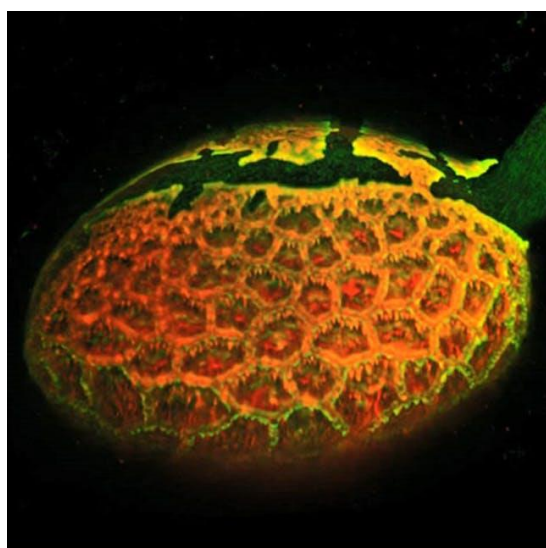
Lukas Kubala, FNUSA-ICRC, Czech Republic - Myeloperoxidase mediated alteration of endothelial function is dependent on its cationic charge

Jan Vrbský, FNUSA-ICRC, Czech Republic - YAP1 mRNA splicing isoforms in development and disease

Virtual System Demonstration: ZEISS Lattice Lightsheet 7

Long-term Volumetric Imaging of Living Cells

The complexity of life is the result of the dynamic interplay within and between molecules, organelles, cells and tissues. Deciphering the underlying processes and principles has always been the most prominent pacer, driving technological breakthroughs in microscopy. Our portfolio allows scientists to capture all these levels of complexity with maximum gentleness. High-speed volume acquisition with minimal light exposure and almost isotropic resolution is achieved by novel ZEISS Lattice Lightsheet 7.



In this live demonstration, we will summarize the technical background of lattice lightsheet imaging and applications in fluorescence microscopy. The presentation will be followed by a Q&A session.

Key Learnings

Gentle long-term imaging of living specimen

High-speed volumetric imaging

Nearly isotropic resolution for high quality 3D visualization & quantification

© Sample courtesy of R. Whan, UNSW, Sydney, Australia

Speakers

Moderation – Katerina Zertova

(Regional Marketing Manager for Europe, Middle East, and Latin America)

System Demonstration – Dr. Steffen Burgold

(Application Specialist, ZEISS Microscopy Customer Center Europe)

Steffen Burgold studied biotechnology at the University of Applied Sciences Jena, Germany and worked as a process engineer at the startup company Novosom AG in Halle, Germany. In his postgradual master studies in photonics he emphasized on light microscopy techniques and did his thesis at the Charité, Berlin with Prof. Michael Schaefer. He moved on with his PhD and postdoc in neurobiology (Alzheimer disease) with Prof. Herms at the University of Munich and the German Center for Neurodegenerative Diseases, Germany. Here, Steffen established a correlative workflow from intravital microscopy to FIB-SEM imaging of the brain ultrastructure. Since 2017 Steffen has been working as application specialist in the ZEISS Microscopy Customer Center Europe.

TESCAN Amber virtual demonstration: a practical session on cellular ultrastructure investigation by advanced electron microscopy techniques

Traditional techniques in (ultra)structural biology provide information hidden under the surface of cells and tissues, but such information is usually only two-dimensional without much context. Modern microscopic techniques shift towards more holistic approach, where three-dimensional ultra-structure is revealed. Scanning Electron Microscopy (SEM) offers a variety of techniques available to investigate two and three-dimensional organization of biological samples in nanoscale detail.

This session will demonstrate advanced capabilities of TESCAN AMBER scanning electron microscope equipped with a focused ion beam and provide a comprehensive insight into various techniques used in the field of structural biology.

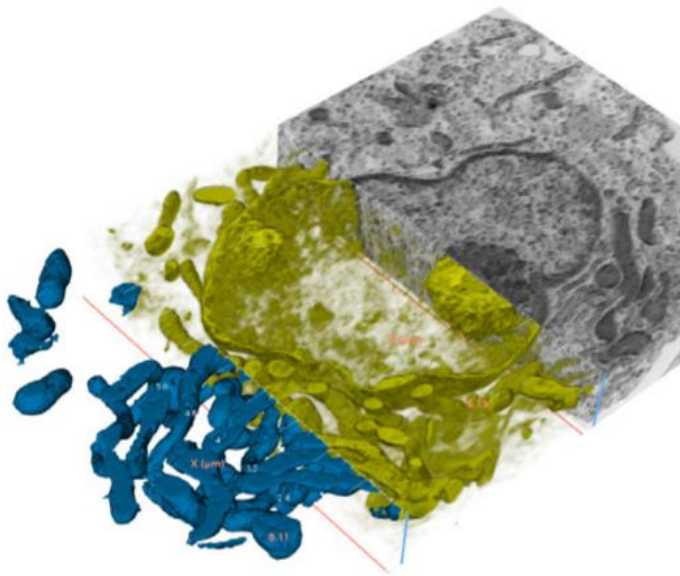


Figure: HeLa cell – 3D visualization of nucleus with nucleolus and mitochondria (blue).

Sample courtesy of Dr. Xuejun Sun, Department of Oncology, Cross Cancer Institute, University of Alberta, Canada.

Speaker

Dr. Jakub Javůrek

Application Specialist, TESCAN ORSAY HOLDING a.s.

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