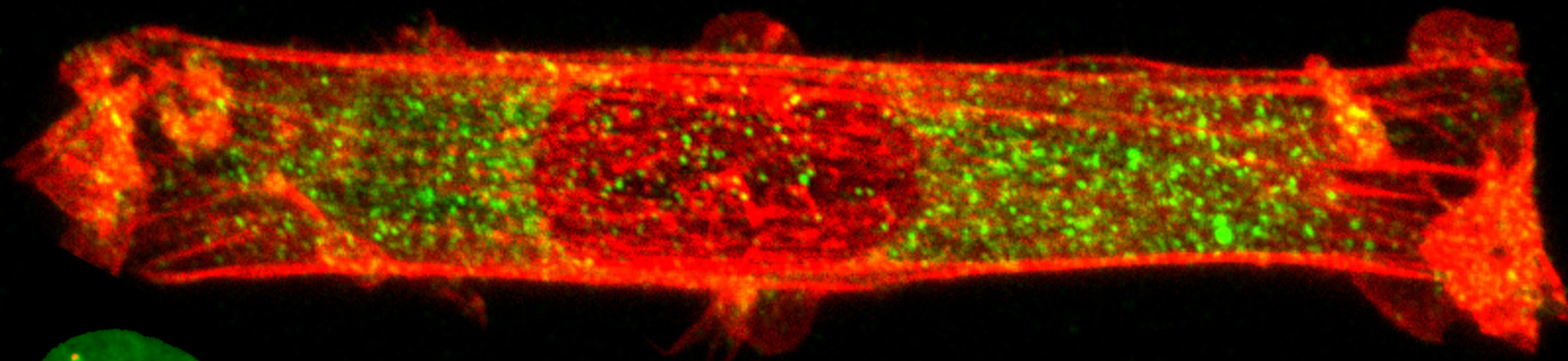


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Mechano-genomics of cell-state transitions

Extracellular mechano-chemical signals regulate gene expression programs and cell-state transitions, although the underlying mechanisms are still unclear. In this talk, I will first highlight the tight coupling between extracellular signals, 3D genome (chromatin) organization, and gene expression. I will then discuss how sustained mechanical signals can induce cell-state transitions and provide avenues to reprogram and rejuvenate aging cells. Furthermore, I will show that the spatio-temporal alterations in genome organization during cell-state transitions, identified using fluorescence imaging combined with machine learning, serve as robust biomarkers to trace ageing-related diseases including cancer and neurodegeneration. Collectively, our results provide novel insights on the mechanical regulation of genome function but also have important applications in regenerative medicine and early disease diagnostics.



G.V. Shivashankar

ETH Zurich & Paul Scherrer Institute, Switzerland

G.V. Shivashankar is currently a Full Professor of Mechano-Genomics at the Department of Health Science and Technology, ETH Zurich jointly with the Paul Scherrer Institute, Switzerland. His research focuses on understanding the

coupling between cell mechanics and genome organization for the regulation of cell homeostasis and cell state transitions. In addition his group also developed imaging-AI based chromatin biomarkers as fingerprints for cells in health and disease. He carried out his PhD at the Rockefeller University (1994-1999) and Postdoctoral research at NEC Research Institute, Princeton USA (1999-2000). He was a tenured faculty at the National Center for Biological Sciences, NCBS-TIFR-Bangalore, India (2000-2009) before relocating to the Department of Biological Sciences at the National University of Singapore (NUS), where he served as the Deputy Director of the Mechanobiology Institute (2011-2019) and held a chair professorship between NUS and the FIRC Institute of Molecular Oncology (IFOM) (2014-2019). His scientific awards include the Birla Science Prize in 2006, the Swarnajayanthi Fellowship in 2007. He was elected to the Indian Academy of Sciences in 2010 and to the EMBO membership in 2019.

3:30 PM, 7th May 2024

Zoom link: <https://shorturl.at/iGHQ8>

Meeting ID: 928 0785 2899

Passcode: 070807

Emmy Noether Seminar
Room
ICTS, Bengaluru

