

MONDAY

COLLOQUIUM

Mechano-Genomics of Cell-Fate Decisions

G V Shivashankar (PSI, Switzerland)

4 Aug 2025 (Monday) | 16:00 Hrs (Tea / Coffee 15:45 Hrs) | Venue: TIFRH Auditorium

Extracellular mechano-chemical signals regulate gene expression programs and cell-fate decisions, although the underlying mechanisms are still unclear. In this talk, I will first highlight the tight coupling between extracellular signals, 3D genome (chromatin) organisation, and gene expression. I will then discuss how sustained mechanical signals can induce cell-fate decisions and provide avenues to reprogram and rejuvenate aging cells. Furthermore, I will show that the spatio-temporal alterations in genome organisation during cell-fate decisions, 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.