



# BIOENGINEERING SEMINAR

**Bioengineering Seminar at 4:00 PM on April 27<sup>th</sup>, 2015**  
**MRDG Seminar Hall, First Floor, Biological Sciences**

## Nuclear Mechanics and Genome Regulation

**Prof. G. V. Shivashankar**

**Mechanobiology Institute, National University of Singapore,  
Singapore**

**Abstract:** Physico-chemical signals from the extracellular matrix impinge on cellular geometry resulting in altered functional nuclear landscape and gene expression. While these alterations regulate diverse biological processes including stem-cell differentiation, developmental genetic programs and cellular homeostasis; the biophysical principles underlying such control systems are unclear. Using a multidisciplinary approach, combining high resolution live-cell imaging, micro-patterned substrates and single-cell mechanics experiments, our laboratory investigates the biophysical principles underlying the coupling between nuclear mechanics and genome regulation. I will describe our ongoing work that provides modular links between cellular geometry and nuclear mechanics and its impact on 3D organization of chromosomes and gene expression.

### **About the speaker:**

Prof. G. V. Shivashankar is currently the Deputy Director of Mechanobiology Institute, National University of Singapore. Shivashankar's laboratory is focused on understanding the role of cell geometry on nuclear mechanics and genome regulation in living cells using a multi-disciplinary approach. He carried out his PhD research at the Rockefeller University (1994-1999) and Postdoctoral research at NEC Research Institute, Princeton USA (1999-2000). He started his laboratory at the National Center for Biological Sciences, TIFR- Bangalore, India (2000-2009) before relocating to a tenured faculty position at the National University of Singapore in 2009. His scientific awards include; the Birla Science Prize (2006), The Swarnajayanthi Fellowship (2007) and was elected to the Indian Academy of Sciences (2010). He Edited the Methods in Cell Biology series book on "Nuclear Mechanics and Genome Regulation" (2010), Elsevier Press. More recently he Heads the Joint Research Laboratory with FIRC Institute of Molecular Oncology (IFOM), Milan, Italy and was appointed as an IFOM-NUS Chair Professor in 2014.