

BioSyM Seminar Series 2017

Whole embryo 3D deformation map during Zebrafish early embryogenesis

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Venue : Level 4, BioSyM Seminar Room



Abstract

Morphogenetic movement plays a key role in early embryogenesis in multicellular organisms. An important morphogenetic event during early embryo development is the convergence and extension at mid-gastrulation stage, where cells collectively move from the ventral side of the embryo towards the dorsal axis, underlying the neural tube formation as well as the somatogenesis. Although, the mechanics of early development is intensively studied at the cellular level but due to the technical challenge for quantifying the force and deformation the global mechanics at the tissue level remains unknown. Here we have developed a multi-view light-sheet microscopy and combined high-end computational methods to calculate the strain map of zebrafish development representing the tissue deformation, during mid-gastrulation. Furthermore, based on these results we have identified strain associated with convergent extension and pre-somatogenesis events. We have developed the strain maps as the first step to understand the mechanical forces that leads to morphogenesis.

Short Biography

Dr. Dipanjan Bhattacharya did his M.Sc in Physics and then the Ph.D in Biophysics in a collaborative program between Raman Research Institute, India and National Center for Biological Science, TIFR, India. As a Post-doctoral researcher he had joined SMART-BioSyM and worked in a joint position with Mechanobiology Institute, Singapore. His research interest is in developing novel microscopic and biomechanical techniques to understand cellular and tissue dynamics.