



Indian Institute of Science  
Centre for BioSystems Science and Engineering



## Seminar

At 4:00 PM on 10<sup>th</sup> September 2018 (Monday)  
CES Seminar Hall, 3rd Floor Biological Sciences Building

### Emergence of a bilaterally symmetric body plan during zebrafish embryogenesis

**Dr. Sundar Naganathan**  
Postdoctoral Fellow, EPFL

#### Abstract

How does a left-right (LR) symmetric body plan emerge during embryonic development in vertebrates? LR symmetry in embryos is first observed during a process called somitogenesis, where the body axis is periodically segmented into epithelial blocks known as somites. Somites, which give rise to the musculoskeletal system, form bilaterally on either side of a tissue called the notochord. The size, shape and anteroposterior position of bilateral somites need to be symmetric across the notochord to ensure a LR symmetric musculoskeletal system. However, it is unknown how this precise coordination is achieved between the left and right sides during embryonic development. Using light-sheet microscopy and advanced image analysis algorithms, I am quantifying somite physical properties in zebrafish embryos over time. We observe that many bilateral somite pairs form in an asymmetric fashion. Interestingly, we find that these asymmetries are transient and get resolved over time, suggesting that the embryo performs error correction. Uncovering the biophysical mechanisms that correct these errors would be key towards understanding the emergence of body form symmetry, which is fundamental to vertebrate development.

#### About the Speaker

Dr. Sundar Naganathan is a HFSP postdoctoral fellow with Prof. Andrew Oates at EPFL, Lausanne, Switzerland, where he is investigating body axes establishment in zebrafish embryos. He did his Ph.D in developmental biophysics in the lab of Prof. Stephan Grill at the Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany, where he discovered a novel chiral property of the actomyosin cytoskeleton in *C. elegans* embryos. Prior to his Ph.D, he was a Junior Research Fellow at NCBS in the lab of Dr. Sandhya Koushika, investigating synaptic vesicle transport in *C. elegans* axons. His scientific interests are in understanding interactions between mechanical and chemical processes that drive body axes establishment during embryonic development.

