

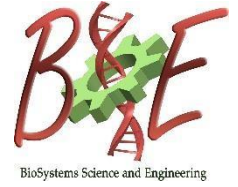


Indian Institute of Science
Centre for BioSystems Science and Engineering

BSSE Seminar

At 4:00 PM on 5th December 2018

CES seminar hall, 3rd Floor Biological Sciences Building



Cargo induced perturbations in very early endosomal dynamics revealed by lattice light-sheet microscopy

Dr. Senthil Arumugam,
Group Leader,
Single Molecule Science, University of New South Wales, Australia

Abstract

The dynamics and fate of endosomal vesicles following endocytosis at the plasma membrane are central to the understanding of transport phenomena and signal processing by living cells. Imaging multiple species of endosomal markers along with cargoes like transmembrane receptors, cellular pathogens etc. is central to understanding the organizational principles of trafficking. Endosomes, however, display complex behaviors in their dynamics that demands high temporal resolution and at the same time owing to their stochastic motility characteristics in the 3-dimensional milieu, demands volumetric imaging. This poses a non-trivial challenge - volumetric imaging of multiple species of fluorophores in high spatiotemporal resolution in living cells. We capitalize on the Lattice light-sheet based microscopy along with tailored image analysis routines to essentially follow the fate of cargoes post internalization. In the particular study, I will describe complex relations between the dynamics of endosomes marked by APPL1 and EEA1 in non-cargo steady-state conditions as well as the first time points of transferrin and EGFR entry into vesicles. We find that while transferrin does not alter the 'state' of endosomal dynamics, EGFR actuates a subset of endosomes and alters the localization of APPL1 and its trafficking characteristics. We further show that this process is dependent on calcium and that the APPL1 results in a shunt pathway of EGFRs to the peri-nuclear region..

About the Speaker

Dr. Senthil Arumugam is a group leader at the Single Molecule Science at the University of New South Wales since Aug 2016. His current research focusses on understanding the dynamic intracellular organization of single cells using rapid volumetric microscopy. He obtained his Masters from Tata Institute of Fundamental Research, India in 2008 and then earned his Ph.D. from Technical University of Dresden and MPI-CBG, Dresden, Germany in 2012. He moved to Paris for his postdoctoral training at the Curie Institute and was a visiting scientist at the National Centre for Biological Sciences, Bangalore, India before starting his own group (www.cellphylab.com) in Sydney, Australia.

