

SCMS Seminar



DATA-DRIVEN MULTISCALE MODELING OF CELL FATE DYNAMICS

Speaker: Prof. Qing Nie

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Time: 10:00 - 11:30 am, Tuesday, June 27, 2017

Venue: Room 1704, East Guanghua Tower (Main), Fudan University

Abstract: Fates of cells are not preordained. Cells make fate decisions in response to different and dynamic environmental and pathological stimuli. Recently, there has been an explosion of experimental data at various biological scales, including gene expression and epigenetic measurements at the single cell level, lineage tracing, and live imaging. While such data provide tremendous detail on individual elements, many gaps remain in our knowledge and understanding of how cells make their dynamic decisions in complex environments. In addition to developing new models to analyze data at each scale, we are working on multiscale modeling challenges in analyzing single-cell molecular data and their connections with spatial tissue dynamics. Our approach requires new and challenging mathematical and computational tools in network inferences, stochastic analysis and simulations, and PDEs with moving boundaries. We then use our novel data-driven multiscale modeling and computational methods to uncover new principles for cell fate dynamics in development, regeneration, and disease.