

Center for Theoretical Biological Physics



SEMINAR

“Many-Body Problem of Classical Mechanics and Dynamics of Mitotic Spindle”

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12:30 - 1:30 PM

BRC, 10th Floor, Rm 1060 A/B



Abstract: Prior to cell division, chromosomes are segregated by mitotic spindle. This molecular machine self-assembles remarkably fast and accurately by an elegant force balance in which a few tens of chromosomes both attract and repel to centrosomes, while the centrosomes also repel or attract each other. The open question - how does this balance of force maintains the prospindle configuration - leads to a difficult many-body problem of classical mechanics. I will show how Lyapunov function estimates, discrete stochastic compute simulation, solution of integro-partial differential equations and experimental microscopy, combined, help to solve this question. I will also show how mathematical modeling contributes to understanding abnormal division of cancer cells with multiple centrosomes.