

Seminar

Unraveling the spatial organization of chromosomes by single-molecule imaging

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Deciphering the molecular mechanisms underpinning the three-dimensional genome organization is of high importance due to its decisive role in vital cellular processes. I will present our single-molecule work focusing on the dynamics of genome organization. Based on the single-molecule DNA visualization assay we developed¹, I will show that DNA sequence directly encodes the structure of supercoiled DNA as evident from the pinning of plectonemes at specific sequences². I will then talk about how condensin molecules create loops on DNA molecules, presenting a first direct visual proof for DNA loop-extrusion by SMC complexes³.

References:

1. Ganji, M.*, Kim, S. H.*, et al. Intercalation-Based Single-Molecule Fluorescence Assay to Study DNA Supercoil Dynamics. *Nano Lett.* 16, 4699–4707 (2016).
2. Kim, S. H.*, and Ganji, M.*, et al. DNA sequence encodes the position of DNA supercoils. *Elife* 7, 2245 (2018).
3. Ganji, M. et al. Real-time imaging of DNA loop extrusion by condensin. *Science* 360, 102– 105 (2018).

Tuesday, Feb 11th 2020

4:00 PM (Tea/Coffee at 3:30 PM)

Seminar Hall, TIFR-H