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Using Transcription to Measure DNA Mechanics One Molecule at a Time

ROB PHILLIPS, California Institute of Technology

There is a rich and interesting interplay between the informational and physical characteristics of genomes. Examples range from how DNA is packed in organisms as diverse as bacteriophage and humans to the biophysical factors dictating nucleosome accessibility to the nature of DNA looping as part of the transcriptional repertoire of a host of different cells. In this talk I will describe recent experiments that explore the mechanics of genome management, how simple models can be constructed to interpret such experiments (and used to make predictions for new experiments) and examples of both single-molecule and single-cell approaches to the study of how cells make decisions and the way in which DNA mechanics governs these decisions. Special attention will be given to using Lac repressor as a tool for reading out the flexibility of different DNA sequences.