DEPARTMENT OF BIOENGINEERING

& Center for Theoretical Biological Physics (CTBP)

Presents a Joint Seminar Entitled

ADVENTURES IN NON-LOCAL AND GLOBAL GENE REGULATION

Presented By:

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Tuesday, Jan. 14

Lunch Served at 12:00pm, Seminar Begins at 12:10pm; BRC 280

ABSTRACT

Traditionally, we believe that gene are regulated via trans acting factors like transcription factors interacting with local cis regulatory elements encoded in the DNA itself. The potential for long-range regulation, however, raises the potential for far more complex modes of transcriptional control. Through the use of new single molecule RNA imaging techniques, we explored non-local cis regulation of transcription. Examples include chromosome-wide transcriptional changes induced by chromosomal translocation, transcriptional regulation by long non-coding RNA, and allele-specific expression measured at the single cell level. We also discuss some results regarding RNA concentration homeostasis that force a reinterpretation of single cell gene expression measurements.

ABOUT DR. RAJ

The goal of the Raj Lab is to develop a quantitative understanding of molecular underpinnings of cellular behavior and then use this knowledge to better human health. Our research combines new tools we have developed for single cell imaging with new genomic and computational methods to make highly accurate measurements of the molecular components underlying cellular function, focusing in particular on the behavior of single cells within an ensemble. Many of the measurement tools that we have developed also have applications in diagnostics for infectious disease and cancer. Also, our results also provides a quantitative basis for synthetic biology. Areas of particular interest include cancer biology, long non-coding RNA, quantitative genetics, stem cell biology with applications to cartilage regeneration and diagnostics based on ultra-rapid viral detection.

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