

"Kinetic regulation of mycobacterial transcription"

Abstract:

Transcriptional regulation allows organisms to selectively tune the expression of their genome depending on developmental or environmental cues. In Bacteria, transcriptional regulation is typically enacted via transcription factors that bind to promoters in a DNA sequence specific manner which gives them specificity. This sequence-dependence allows evolution to direct the activity of particular factors to particular genes. However, there exist another class of transcription factors which lack sequence specificity and instead bind solely to the RNA polymerase. Two factors in this class are CarD and RbpA; essential proteins in *Mycobacterium tuberculosis* that enact gene regulation by modulating the kinetics of transcription initiation. Interestingly, they appear to be capable of both activation or repression depending on the basal kinetics of a particular promoter sequence. I will present our recent experimental work to elucidate the mechanisms CarD and RbpA and will describe a tool we have built to calculate the effect of kinetic regulation on transcriptional flux across promoter space.