



## Life Sciences Seminar

# Transcriptional regulation of developmental genes

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Host: Gasper Tkacik

How transcriptional bursting relates to gene regulation is a central question that has persisted for more than a decade. Here, we measure nascent transcriptional activity in early *Drosophila* embryos and characterize the variability in absolute activity levels across expression boundaries. We demonstrate that boundary formation follows a common transcription principle: a single control parameter determines the distribution of transcriptional activity, regardless of gene identity, boundary position, or enhancer-promoter architecture. We infer the underlying bursting kinetics and identify the key regulatory parameter as the fraction of time a gene is in a transcriptionally active state. Unexpectedly, both the rate of polymerase initiation and the switching rates are tightly constrained across all expression levels, predicting synchronous patterning outcomes at all positions in the embryo. These results point to a shared simplicity underlying the apparently complex transcriptional processes of early embryonic patterning and indicate a path to general rules in transcriptional regulation.

**Wednesday, October 23, 2019 11:30am - 12:30pm**

Mondi Seminar Room 1, Central Building



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