

# The relationship between chromatin structure and transcriptional dynamics

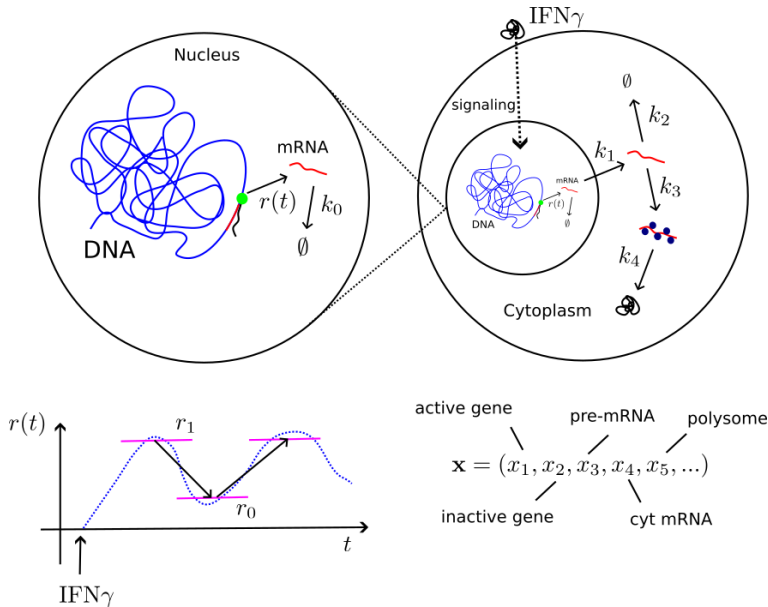
Clayton W. Seitz

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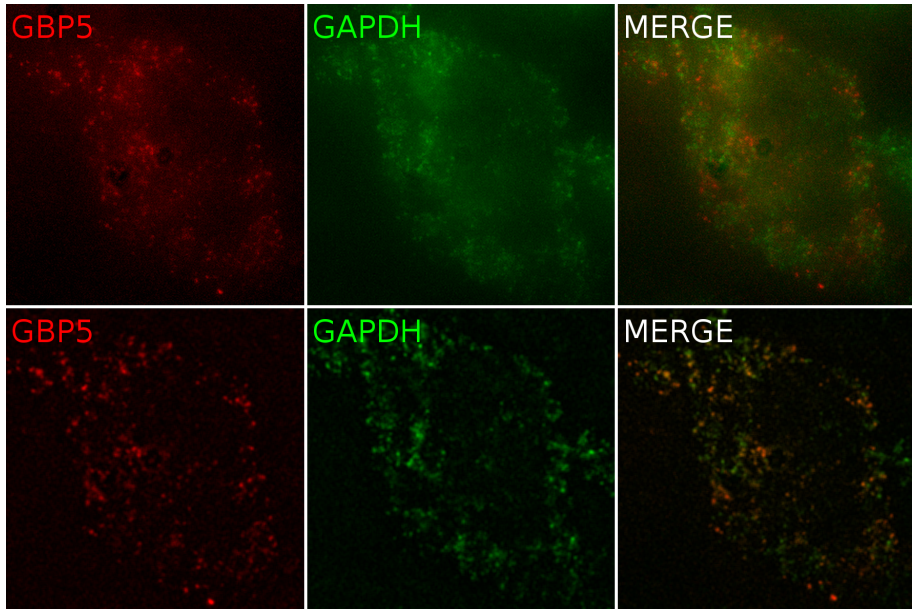
# Summary

- ▶ Preliminary data for GBP5 and GAPDH co-staining
- ▶ The relationship between chromatin structure and transcription dynamics

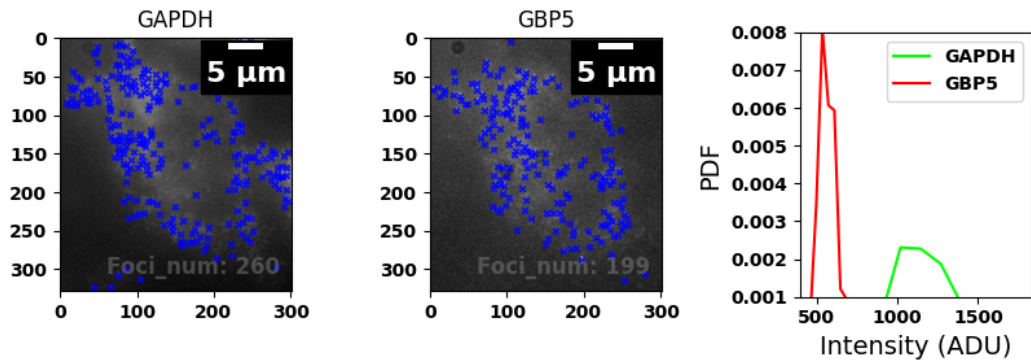
# RNA flow model for transcription dynamics



## Rare HeLa cell GBP5 expression @ 24h after reinduction with IFN- $\gamma$



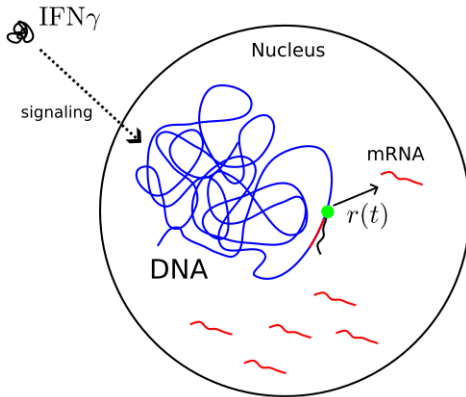
## Intensity histogram for rare GBP5 expression



- ▶ Very few ( $\sim 1\%$ ) reinduced cells express GBP5, but those that do express at high levels (relative to GAPDH)
- ▶ Waiting on the control to determine if this effect is coupled to IFN- $\gamma$
- ▶ RNA flow model may have no meaning (GBP5 transcription is non-ergodic)

# Sources of variability in the rate of gene expression

- ▶ Previous work suggests that IFN- $\gamma$  induces epigenetic changes at the GBP5 locus
- ▶ If some cells get the epigenetic change and others don't, the model breaks down



$r(t)$  is determined by many factors:

- \* 3D Chromatin structure e.g., looping, TADS, ...
- \* Epigenetic modifications (methylation, acetylation)
- \* Chromatin Dynamics (subdiffusion, viscoelasticity)
- \* Formation of transcriptional condensates
- \* Thermodynamic fluctuations - stochasticity
- ...



not necessarily independent

Paper on epigenetic modifications to chromatin structure