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Properties of gene expression including the non-functional binding of transcription factors to DNA ANAT BURGER, University of California San Diego, ALEKSANDRA WALCZAK, Ecole Normale Supérieure, PETER WOLYNES, Rice University — Many eukaryotic transcription factors bind to DNA sequences with a remarkable lack of specificity. This suggests that non-functional binding between transcription factors and DNA might not have the detrimental effect on regulation one would naively assume results from competition for binding. In fact, if binding to DNA protects transcription factors from degradation, the number and binding affinity of these 'decoy' binding sites should have no influence on the copy number of transcription factors available for regulation. We calculate the influence of adding decoy binding sites on several important aspects of gene expression including the noise, the time to reach steady state, and bimodal switch rates. Analyzing these effects could shed some light on how a gene functions in the 'dressed' environment of a genomic background.

Anat Burger
University of California San Diego

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