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Abstract for an Invited Paper
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Quantifying Gene Expression and Regulation in Living Cells by Fluorescence Fluctuation Imaging[1]

MATT FERGUSON, Boise State University

Mechanisms of transcription and translation take the information encoded in the genome and make it "work" in cells, through the production of proteins defined by nucleic acid coding regions. This involves the coordination of many multi-subunit complexes about which most knowledge is inferred from ensemble and/or in vitro assays, giving a detailed but static picture. How these macromolecular machines coordinate in living cells remains unknown but recent advances in the application of fluctuation analysis to time resolved multi-color fluorescence imaging can now give an unprecedented level of dynamic in vivo information. My talk will describe recent results on a study of RNA transcription and splicing in human cancer cell lines. By two color, in vivo, RNA fluorescent labeling, we visualize the rise and fall of the intron and exon during transcription of a single gene in human cells. By cross- correlation analysis, we determine the speed of transcription, co-transcriptional splicing and termination of the RNA transcript discerning correlation between elongation, splicing, cleavage and their relation to the chromatin environment.

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