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Abstract for an Invited Paper  
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### **Cellular Noise and Metabolism<sup>1</sup>**

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No two individual cells “look” the same, even if they share the same genes and grow under identical conditions. This unexpected phenomenon, generally termed cellular noise, emerges in part from the stochastic nature of molecular-level interactions within individual cells, predominantly during protein production. As such, a form of heterogeneity in the amount and types of proteins between cells arises. In this talk, I will introduce the phenomenon of cellular noise and discuss its physical origins, as well as the bioimaging and microfluidic methods [1] that we employ to investigate it. I will then proceed with our recent findings in the context of how cellular noise in protein content translates into noise during cellular function and specifically metabolism. Our focus here will be on cellular growth, lipid accumulation, as well as the underlying metabolic trade-offs and competition between these two metabolic objectives [2-4]. [1] *Metabolic Engineering* 27, 115-135 (2015). [2] *Scientific Reports* 5, 17689 (2015). [3] *PLOS ONE* 12, e0168889 (2017). [4] *Nature Communications* 10, 848 (2019).