

# Noise and Information Transmission

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Cell-to-cell variability can compromise cellular responses to environmental signals, and it can also enlarge the repertoire of possible cellular responses and hence increase the adaptive nature of cellular behaviors. Mathematical language of information theory has been proposed to quantify the functional importance of this variability. However, application of information-theoretic methods in systems biology is not a trivial task. In this tutorial, I will introduce various information-theoretic quantities and approaches, and then show how some of the difficulties in applying them can be avoided.