# Questions for the Selfstudy: Intrinsic Noise

## Question 1

Please explain in your own words the meaning of the term "finite number effect" and indicate, for which of the following types of molecules in a cell the term "finite number" would be appropriate:

* copy number of genes
* RNA molecules
* ribosomes
* transcription factors
* enzymes in core metabolic pathways

## Question 2

In the paper the authors discuss the measurement of intrinsic noise of gene expression via a fluorescence signal. What enables them to distinguish between fluorescence fluctuations caused by experimental noise (i.e. cells drifting in and out of the measurement area, fluctuations in the light source etc.) from actual fluctuations in the expression levels of the fluorescent proteins?

## Question 3

Please give 2-3 examples for intrinsic and extrinsic sources of noise, both from biological systems and from "real world" systems. For one of the examples of intrinsic noise also indicate what could be done to reduce or enhance this noise.

## Question 4

Have a look at the Model in Figure 1. If you want to obtain a population of cells that show a strong bimodal distribution for the abundance of protein P, which parameters in the model can you adjust to achieve this result.

## Question 5

Please give an example for a biological system where intrinsic network noise could provide a selective advantage. Feel free to be creative and to think up an example that is not already discussed in the review article.