



# CNeuro2022 Lecture Abstracts

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## Abstract 1 – Basic Lecture:

### Bayesian Observer Models

Bayesian observer models refer to a range of computational models widely used in perception and cognition, where humans, animals or artificial agents are modeled as ideal observers whose inferences follow the Bayesian theorem and whose behaviors maximize expected gain. Given our CNeuro2022 schedule, I assume that you will have already had some experience with Bayesian observer models and their applications in perception by the time of my lecture. This lecture will then focus on (1) the application of Bayesian observer models in higher-level cognition, and (2) practical issues in building and testing Bayesian observer models, including common mistakes. My goal is to provide a broader view of what Bayesian observer models are and how they may help us to deepen our understanding of perception and cognition.

## Abstract 2 – Advanced Lecture:

### Cognitive Illusions as Bayesian Inference

It has long been known that many visual illusions can be explained as the consequence of Bayesian inference. More recently, Bayesian inference, in conjunction with the concept of efficient coding, has also been used to account for higher-level “cognitive illusions” (biases), such as the distortions of value and probability in decision making. In this advanced lecture on Bayesian observer models, I will discuss several such examples in recent literature. The basic idea is that the brain tries to use its limited cognitive resources efficiently and reduce the uncertainty of its internal representations, and in doing so leads to systematic cognitive biases.