



CNeuro2024 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:

Structure Priors and Bounded Rationality in Human Learning and Decision-Making

Sound judgment and decision-making require humans to learn the probabilistic structures and rules governing their environment. However, learning these structures often involves solving inverse problems with numerous or infinite potential solutions. This raises the question: how do people approximate the ground truth, and why do they sometimes fail to do so? In this advanced lecture on Bayesian observer models, I will present examples from our recent research revealing striking biases in human learning behavior. These biases can be understood as the consequence of observers who, despite efficiently integrating information, are constrained by limited cognitive capacity as well as the structured biases potentially shaped by real-life experiences.