The goal of the project is to investigate how the signals coming from the body and environment are integrated by the brain and influence the conscious perception. Many examples of perceptual, multisensory, and bodily illusions show that our perceptual experience does not always reflect the current state of the world outside. In fact, one of the most promising contemporary theories claims that the content of conscious percepts reflects the best brain's predictions about the world, rather than the world itself. In this view, the brain has not direct access to the world itself, but only to its own internal states with the ends on the "boundaries of receptors", and therefore it needs to create the internal model of reality through the process of minimizing the mismatches between its own predictions and signals incoming from the senses. Recently, it has been proposed that the process can be described in terms of Bayesian inference, which is a statistical method depicting the ways of updating prior model on the basis of new evidence.

The present project follows this idea by raising the question of how the brain "changes its mind", depending on the previous knowledge and the precision of incoming signals from the body and external world. In the four experiments, we aim at verification of hypotheses regarding the specific effects of sensorimotor priors – which are the experienced-based predictions relating motor actions with their perceptual consequences – on the stream of visual experience during binocular rivalry. The binocular rivalry is an intriguing phenomenon which occurs when different images are presented separately to each eye. In result, the conscious percept continuously fluctuates from one image to another with no accompanying changes of the physical world, which creates an exceptional possibility to track the brain's internal inferences about the reality.

The realization of the project will contribute to better understanding of the mechanisms that underlie the perceptual coherence of our day-to-day experience. The project will also specifically elucidate the role of sensorimotor actions in the process of conscious percept formation. Although the idea that organisms learn to visually perceive the world on the basis of action-perception interactions has existed for a long time, the investigation of those processes in the experimental conditions is still challenging. We aim to approach this problem by using the innovative methodology that combines the simultaneous manipulations of the motor actions and the measurement of conscious perception in the ambiguous visual environment.