The visual world changes quickly and continuously. Thus, the rapid detection of relevant features in the visual world is essential for an organism to cope with such ongoing changes. For example, humans are quick at identifying specific features, like an animal or a face, in the visual scene. The extraction of such features, however, is thought to require the sequential activation of many brain areas. This implies that each involved brain area must process information over a brief period of time. In this talk, I will address two fundamental questions. First, how long does it take a visual area in the mammalian cortex to process enough information for the organism to make a decision about the visual scene? Second, how is the visual scene represented in the visual cortex during this time period? I will address these questions in the mouse using optogenetics, electrophysiology, lesions and behavior, and show that the earliest activity in visual cortex is sufficient to extract key features of the visual scene for the organism to make an appropriate decision.

Biography

Arbora Resulaj is a postdoctoral fellow in the laboratory of Dr. Massimo Scanziani at University of California San Francisco (UCSF). Her research is focused on understanding how neural circuits enable perception, memory and decision-making. Prior to joining the laboratory of Dr. Massimo Scanziani, she received a bachelor's degree in engineering from University of Toronto. She received her Ph.D. from the University of Cambridge, where she was a student in the Cambridge-Janelia Ph.D. program. She worked with Drs. Daniel Wolpert and Michael Shadlen to combine theoretical approaches and experimental findings to study decision-making in humans. She then worked with Dr. Dmitry Rinberg to develop tools and methods to study the timing of olfactory perceptual decisions in mice. Her work has appeared in journals such as Nature. Dr. Resulaj’s postdoctoral work in Dr. Massimo Scanziani’s lab was recently published in 2018. Using behavior, electrophysiology and optogenetics, she provided the first direct answer to a fundamental question in systems neuroscience: what is the speed of visual cortical processing when making a perceptual decision? Her current work is focused on developing methods to study short term memory, and its role in visual perception and decision-making in mice.