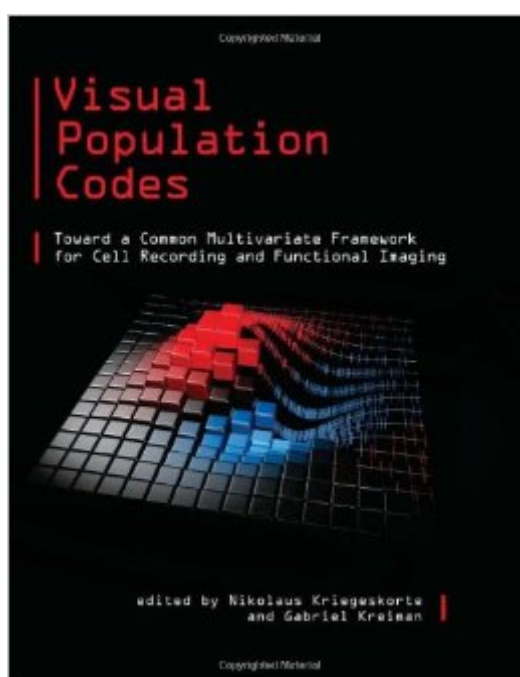# Visual Population Codes: Toward A Common Multivariate Framework For Cell Recording And Functional Imaging (Computational Neuroscience Series)

Synopsis

Vision is a massively parallel computational process, in which the retinal image is transformed over a sequence of stages so as to emphasize behaviorally relevant information (such as object category and identity) and deemphasize other information (such as viewpoint and lighting). The processes behind vision operate by concurrent computation and message passing among neurons within a visual area and between different areas. The theoretical concept of "population code" encapsulates the idea that visual content is represented at each stage by the pattern of activity across the local population of neurons. Understanding visual population codes ultimately requires multichannel measurement and multivariate analysis of activity patterns. Over the past decade, the multivariate approach has gained significant momentum in vision research. Functional imaging and cell recording measure brain activity in fundamentally different ways, but they now use similar theoretical concepts and mathematical tools in their modeling and analyses. With a focus on the ventral processing stream thought to underlie object recognition, this book presents recent advances in our understanding of visual population codes, novel multivariate pattern-information analysis techniques, and the beginnings of a unified perspective for cell recording and functional imaging. It serves as an introduction, overview, and reference for scientists and students across disciplines who are interested in human and primate vision and, more generally, in understanding how the brain represents and processes information.

Book Information

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