

## **Readings in Neuroinformatics**

Slaven Cvijetic, 14.12.18

Bruno A. Olshausen and David J Field. How close are we to understanding V1? *Neural computation*, 17(8):1665–1699, 2005.

### **Abstract**

Our current thinking of the V1 is largely coined by expressions such as simple cells and complex cells or ocular dominance and orientation selectivity columns. These are valid classifications in their own right and as long as the stimulus is sufficiently simple, e.g. a bar or a grating, models based on these concepts will perform well. Under everyday conditions they tend to poorly account for the variety of V1 neurons and its functions. These theories do not envelope sufficiently the functional and computational aspects of V1. Here, we examine the current shortcomings of traditional theories and provide solutions to the current approach. In the V1, a fraction of 12-16% of neurons has a functional account which can be increased by applying chronically-implanted electrodes. We propose, the usage of natural images over abstract and highly simplified stimuli, since they better represent the everyday world with which the V1 is confronted. We hope to provide a starting point for more general theories including the complex relationship to other brain areas.