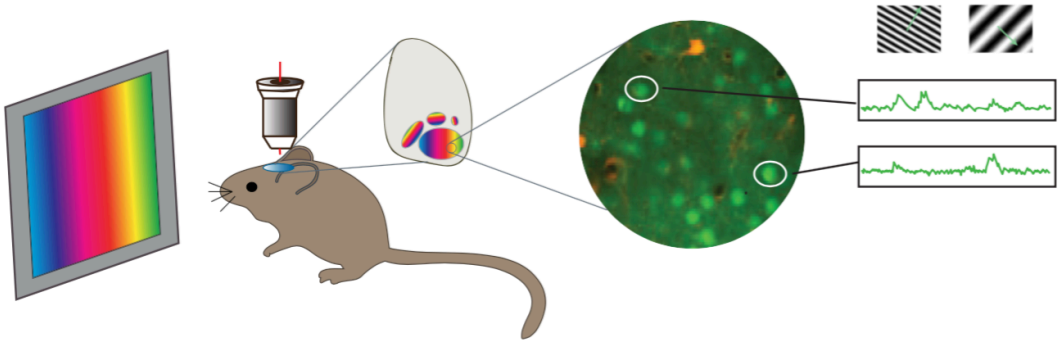
# Spike extraction and stimulus decoding in the primary visual cortex

Anatoly Buchin and Reza Eghbali

# Introduction

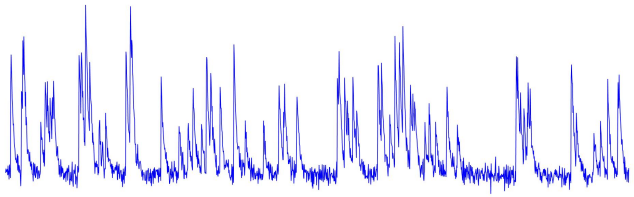
- The Brain is noisy, so are the measurements
- What is the noise? What is the signal?



[Neil et al. 2011]

# Outline

- Spike extraction from the Ca signal in mice V1



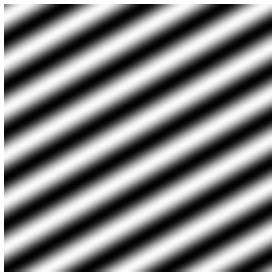


00100101111011010010 10

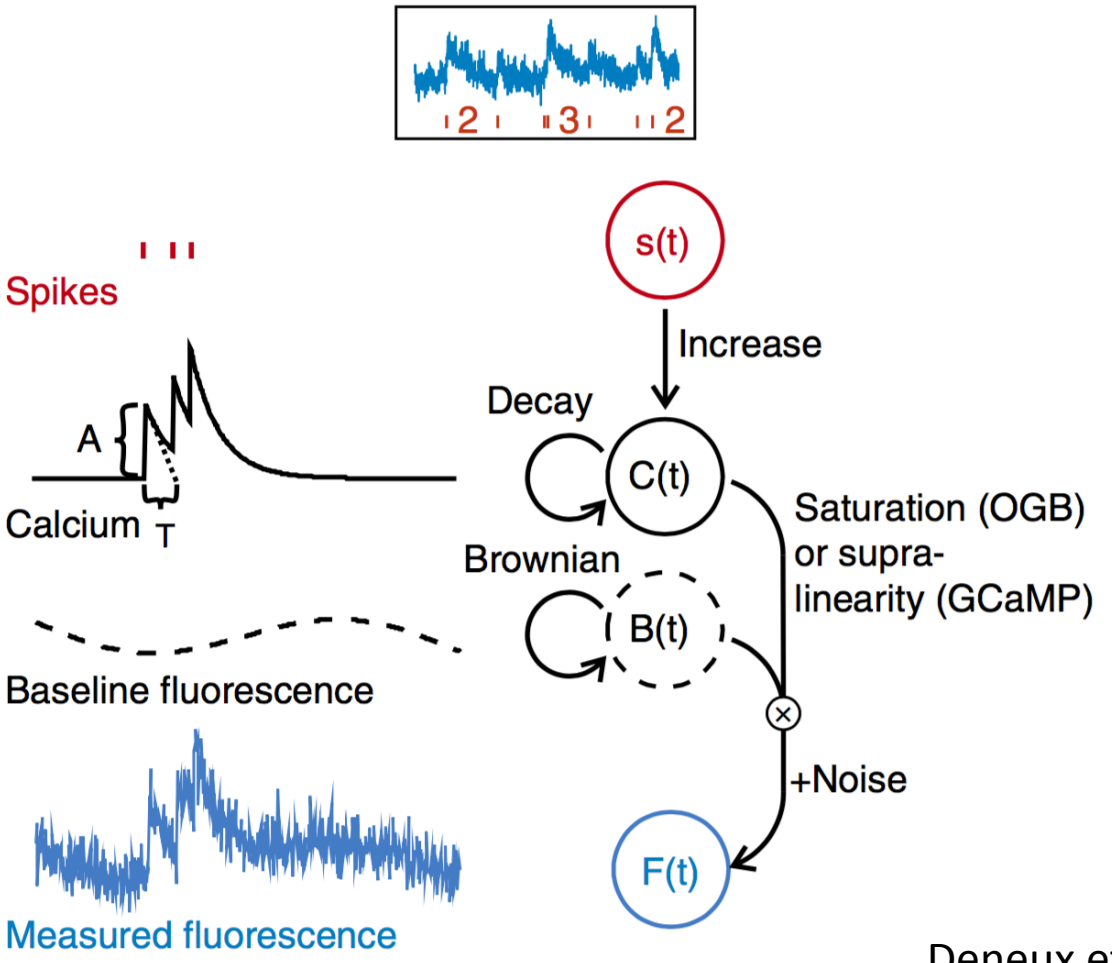
- Decoding of drifting grating orientation

00100101111011010010 10



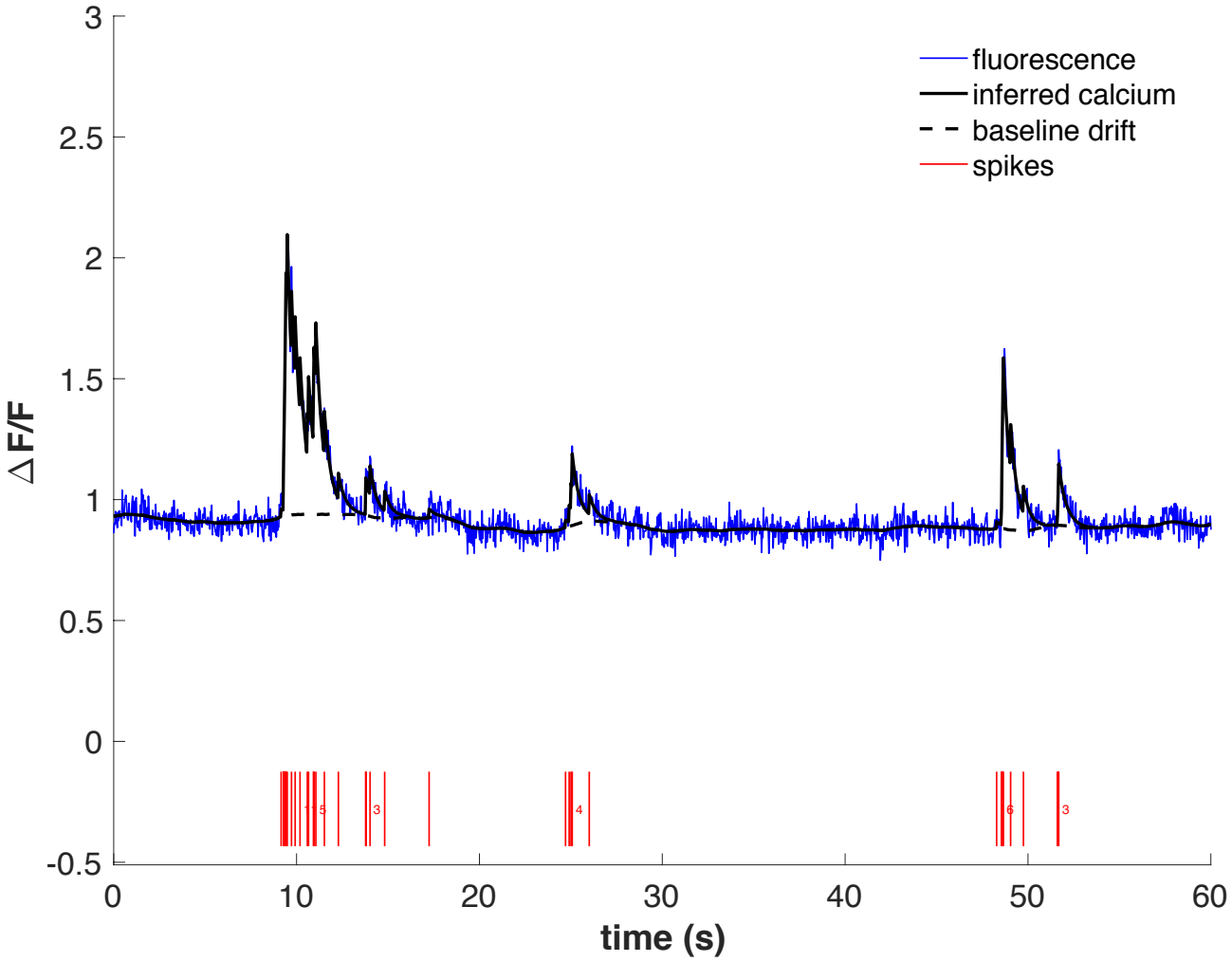


# Spike inference algorithm: ML spike

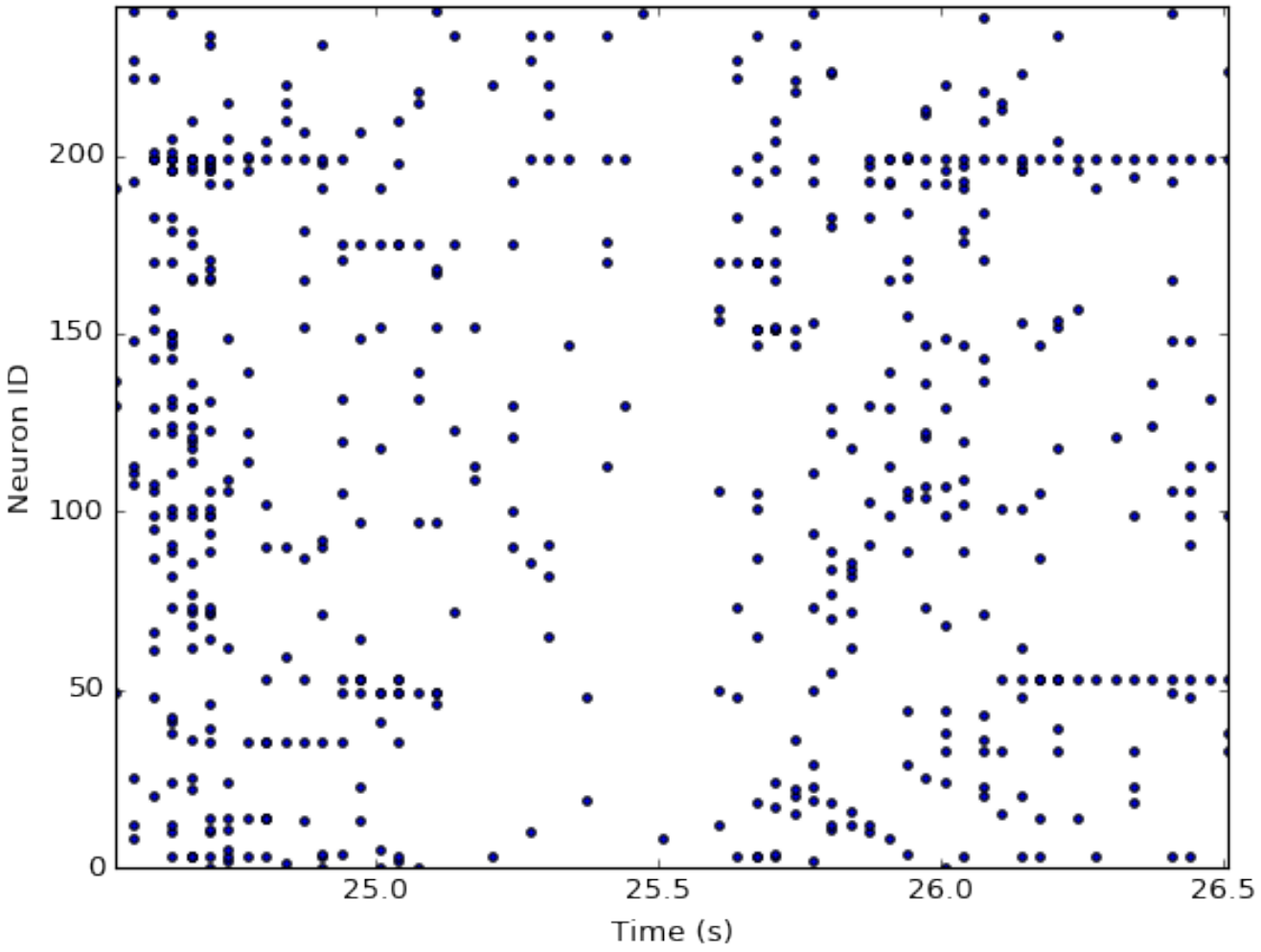


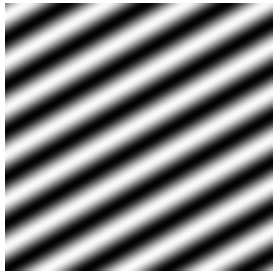

Deneux et al. 2016

# Spike inference results



# Spike inference results



stimulus

# Conclusions

- Spike trains could be efficiently inferred from noisy Ca-imaging
- Rate-based decoding is ~10% more accurate than Ca-based
- Trial-shuffling does not significantly change the decoder performance