

Project 15: Mutual inhibition in memory and discrimination

- 1) Implement the mutual inhibition model from Machens et al. (2005) and reproduce the simulations shown in Figure 4. Compare this to the neural data.
- 2) Follow-up work (Machens et al., 2010) suggested heterogeneity of tuning across prefrontal neurons: many neurons showed ramping dynamics during the delay period, rather than stable maintenance of the initial stimulus (as posited by the original model). How might you modify the model to reproduce both ramping and maintenance activity?

References:

- Machens, C. K., Romo, R., & Brody, C. D. (2005). Flexible control of mutual inhibition: a neural model of two-interval discrimination. *Science*, *307*, 1121-1124.
- Machens, C. K., Romo, R., & Brody, C. D. (2010). Functional, but not anatomical, separation of “what” and “when” in prefrontal cortex. *Journal of Neuroscience*, *30*, 350-360.