

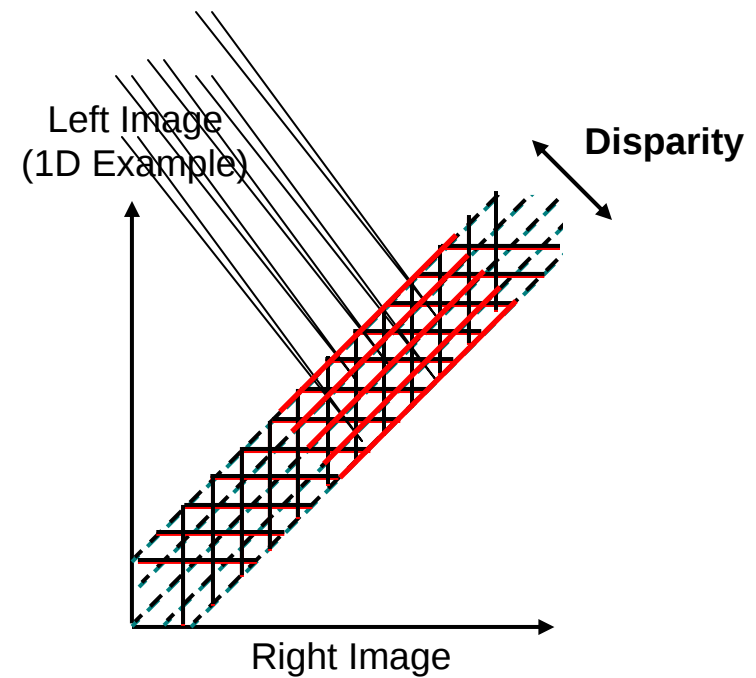
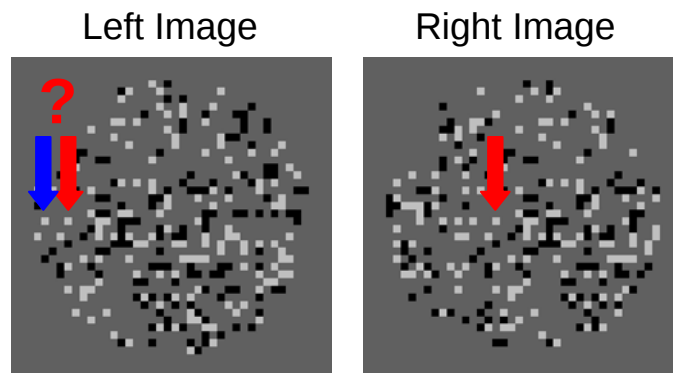
Cooperative processing of spatially distributed disparity signals in macaque V1

Jason M. Samonds, Brian Potetz, Tai Sing Lee

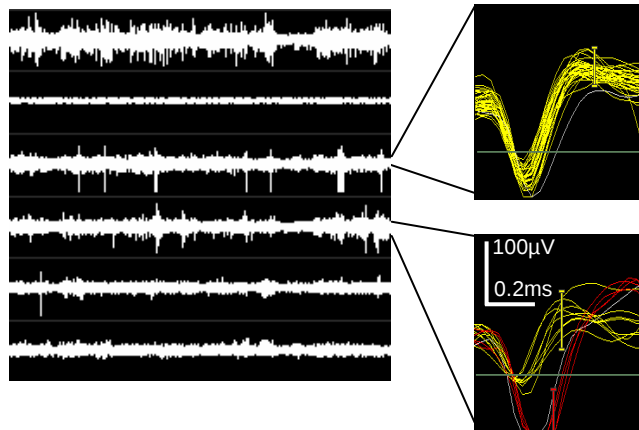
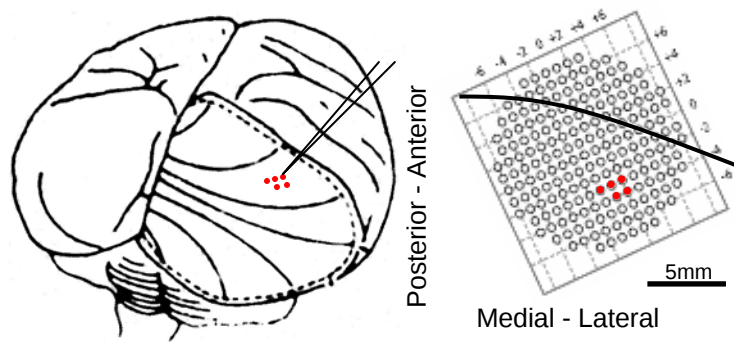


Cooperative Computation of Stereo Disparity

Marr D, Poggio T. *Science* (1976)

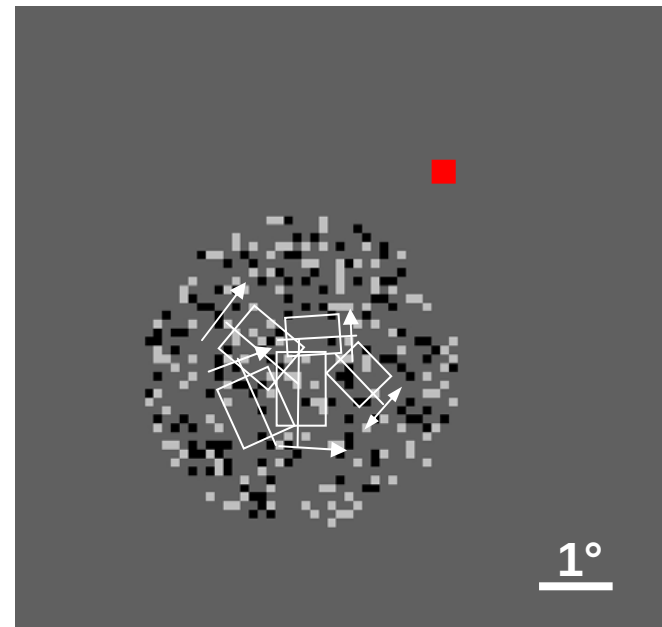


Recording & Stimulation



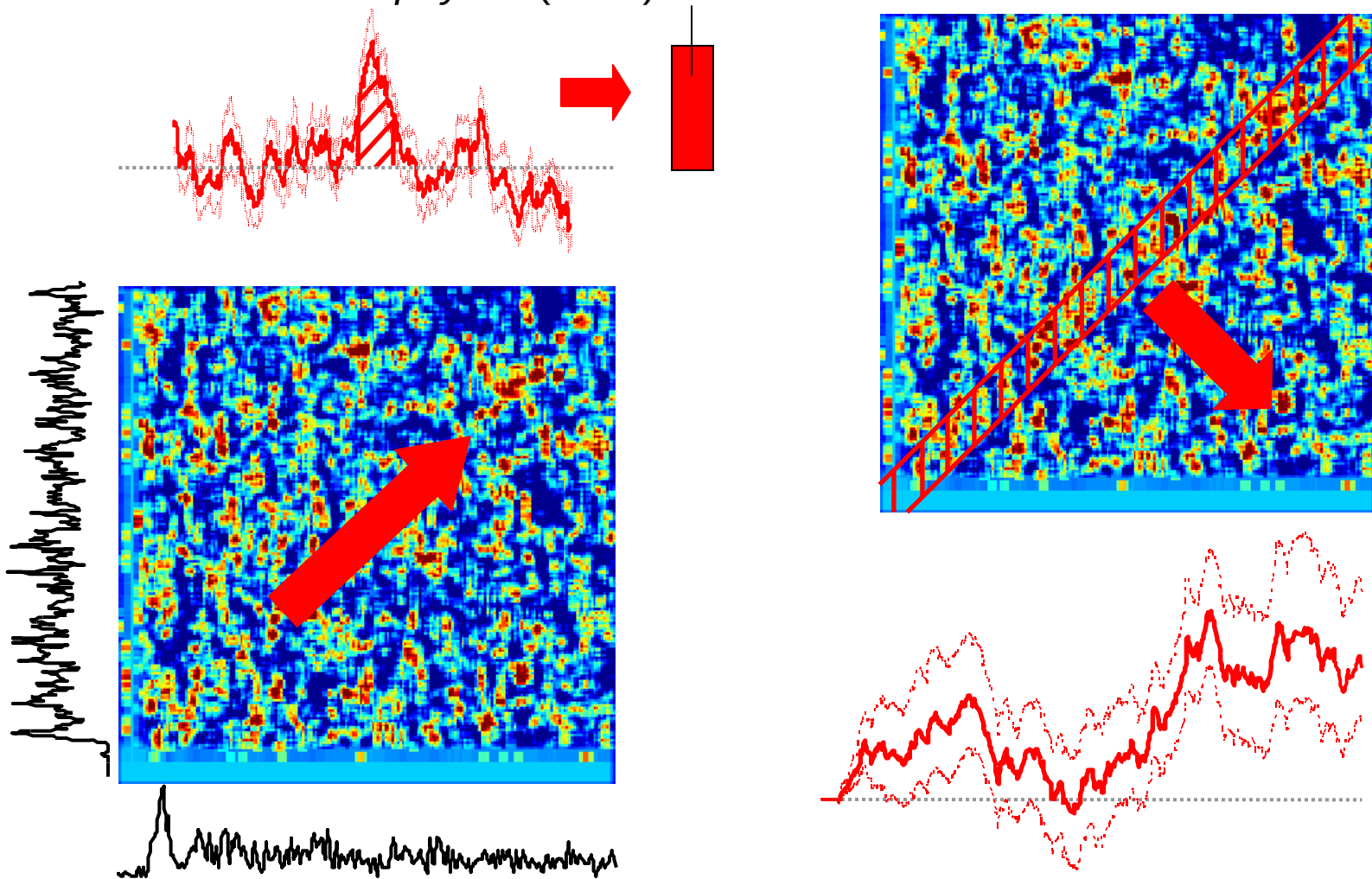
112 V1 cells
74 V1 cells (66%)
 $P < 0.05$, ANOVA

224 V1 pairs
99 V1 pairs (44%)
 $P < 0.05$, ANOVA



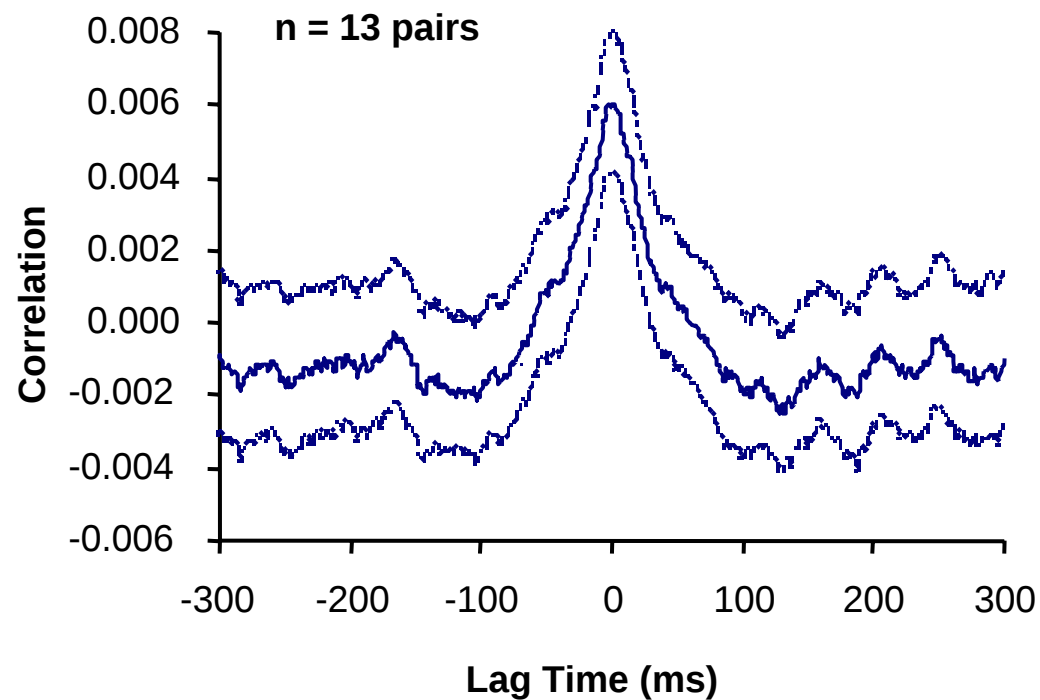
Quantifying Effective Connectivity

Aertsen et al. *J Neurophysiol* (1989)

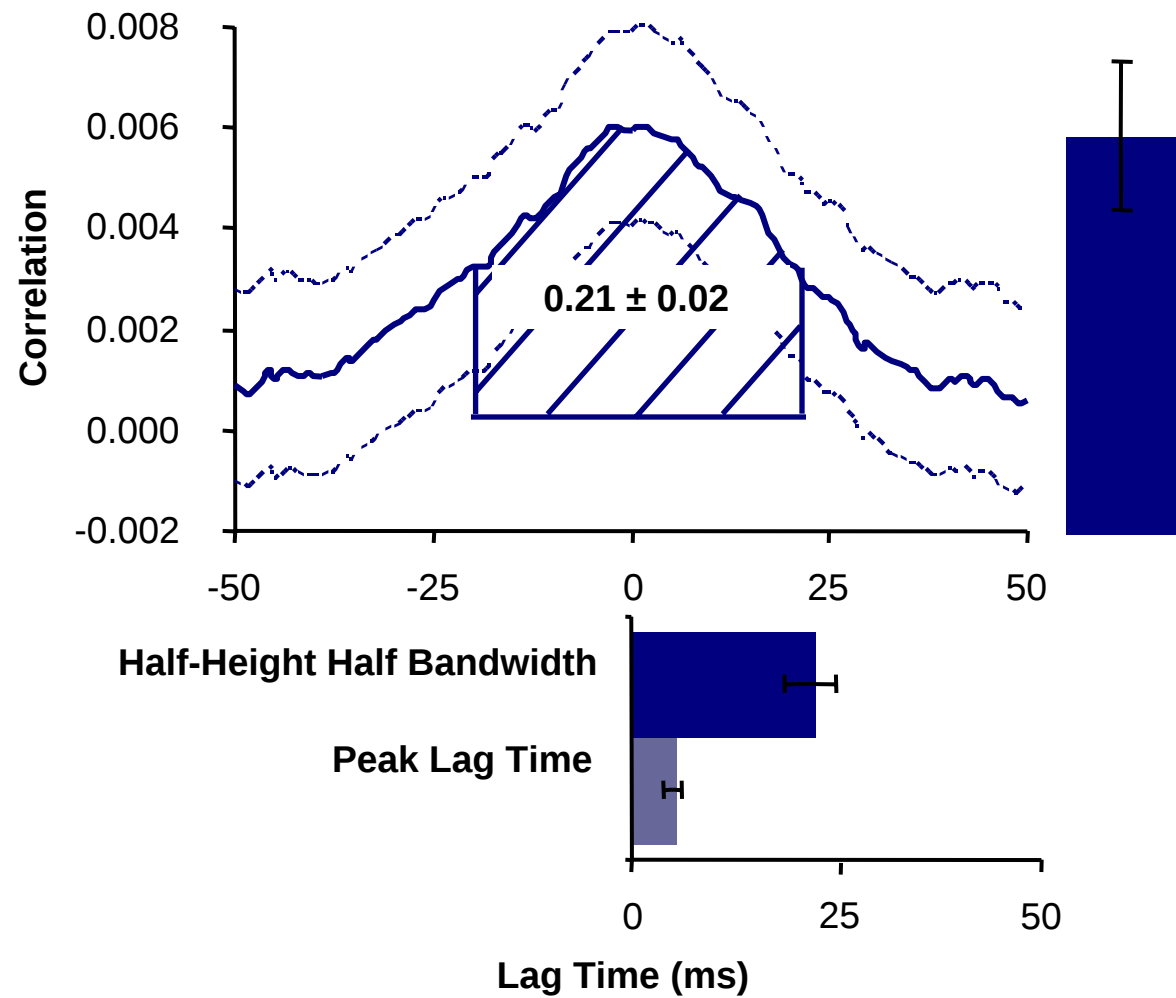


Correlation Peak Properties

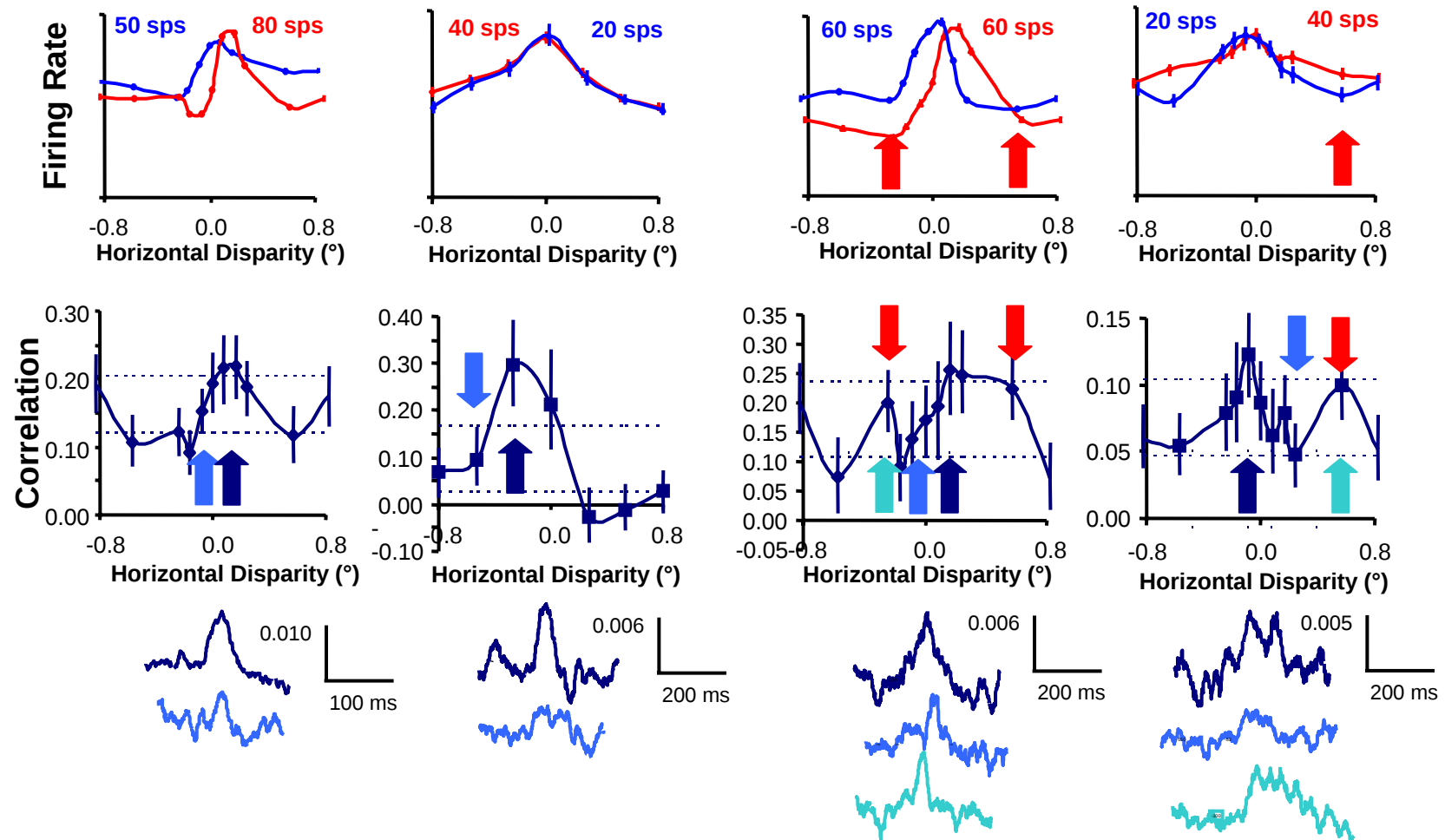
99 V1 pairs, 13 V1 pairs (13%): $P < 0.05$, ± 10 ms peak



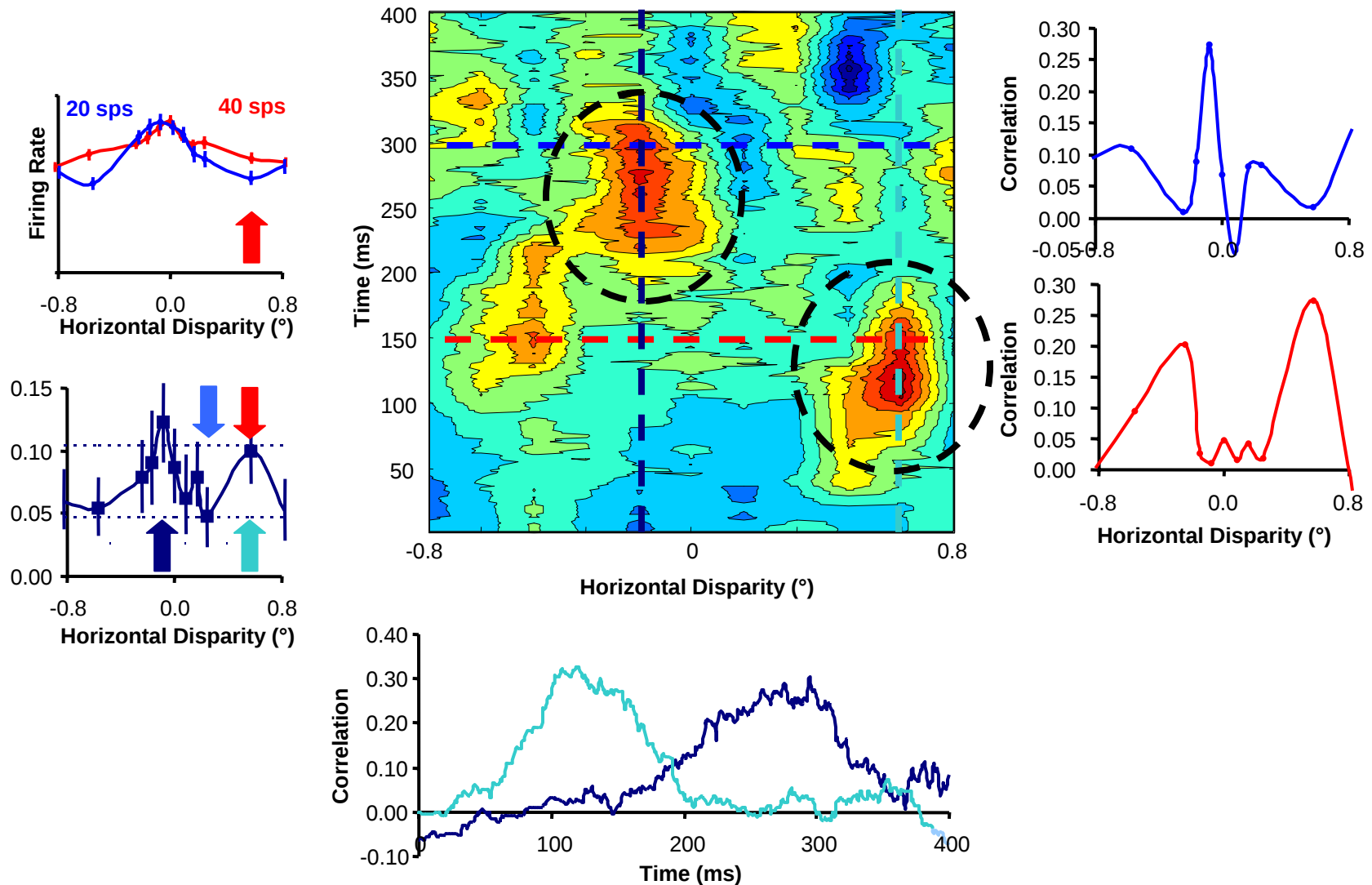
Correlation Peak Properties



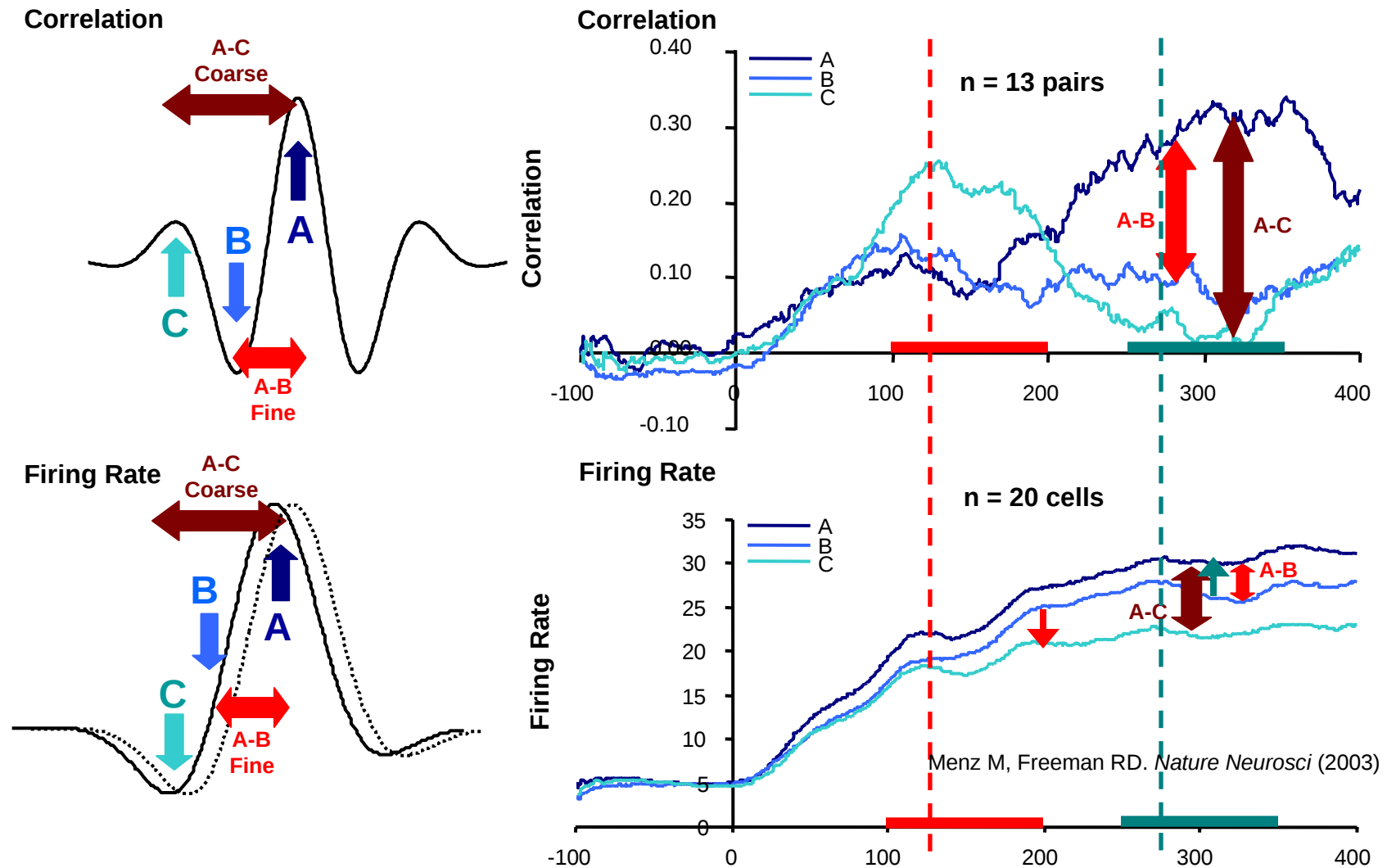
Disparity Dependent Effective Connectivity (Examples)



Temporal Dynamics of Disparity Tuning (Example)

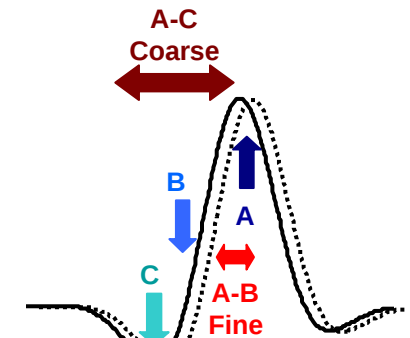
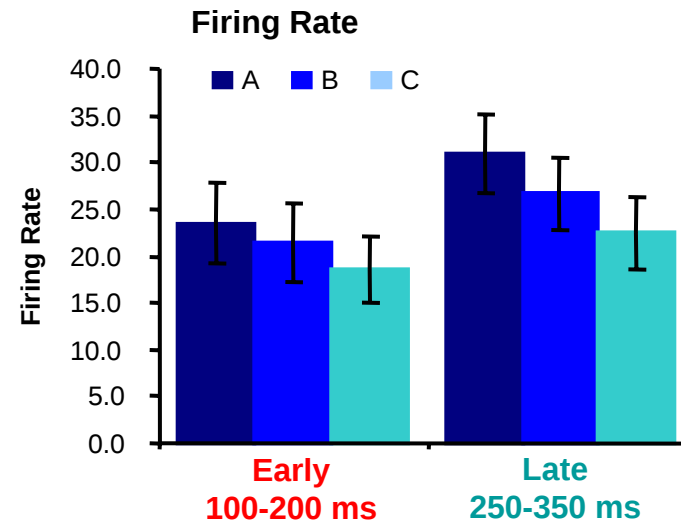
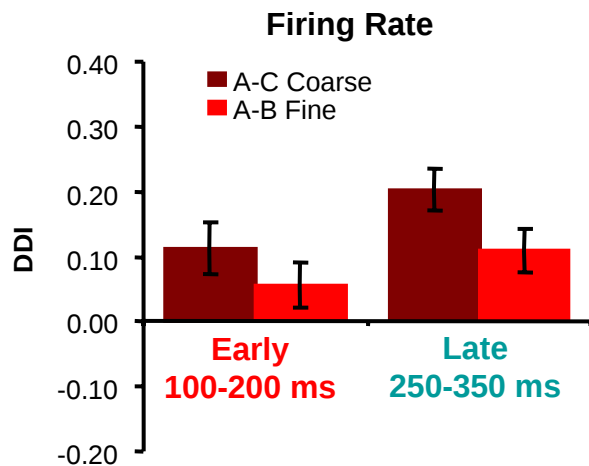
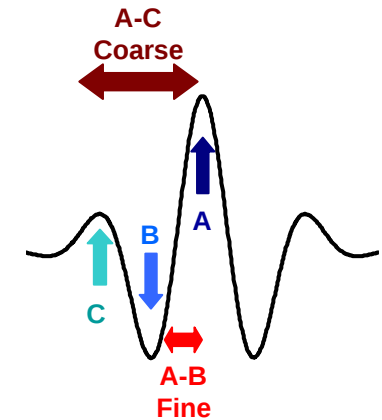
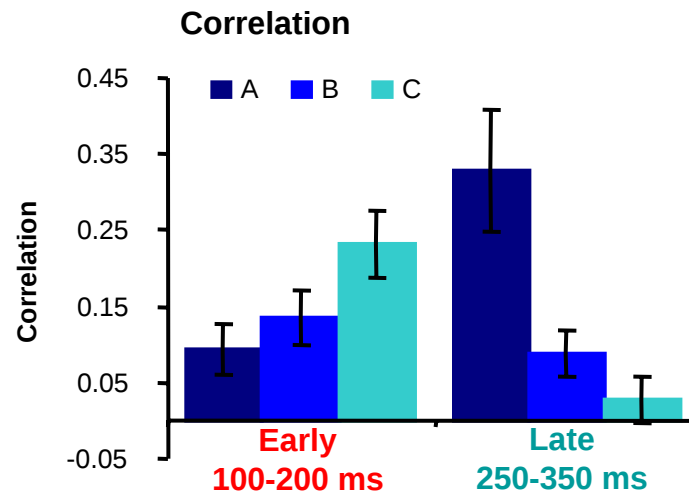
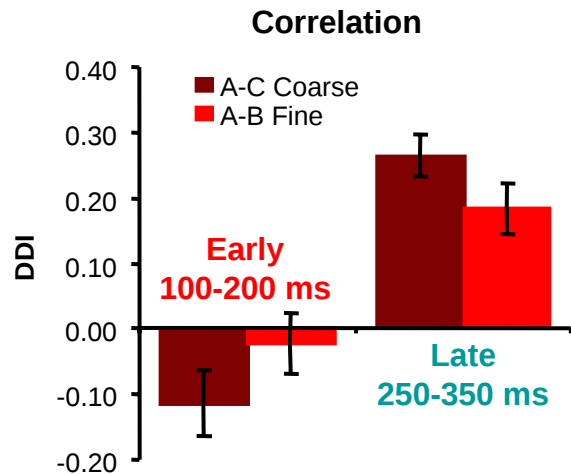


Temporal Dynamics of Disparity Tuning (Population)

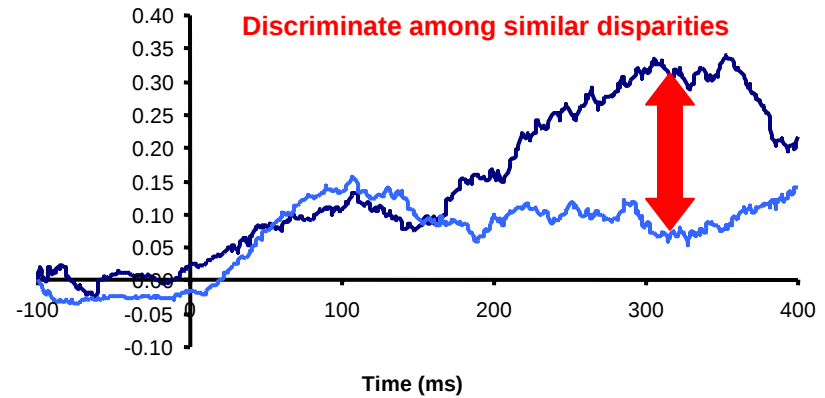
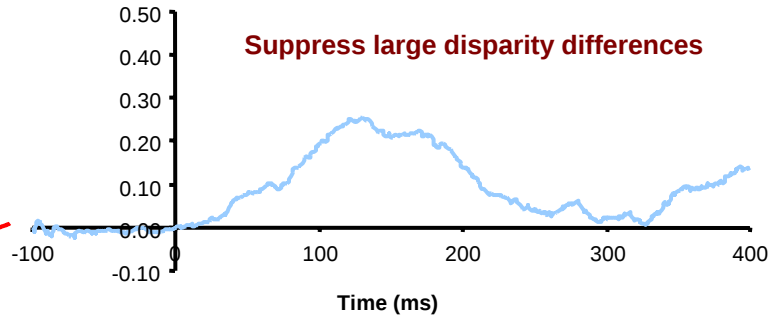
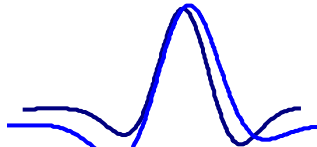
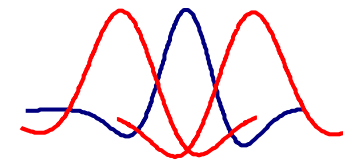
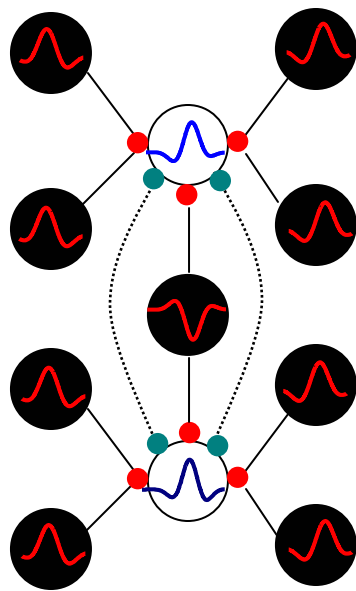


Discrimination of Coarse and Fine Disparity

$$DDI(A,B) = \frac{A - B}{|A - B| + 2 * RMS_{Error}}$$



Cooperative Processing of Disparity Information



Prince et al. *J Neurophysiol* 2002
Menz & Freeman. *J Neurophysiol* 2004



Thank you for your attention!

- George Gerstein
 - For software and technical assistance
- Bela Julesz
 - For inspiration and the random dot stereogram!



- Supported by: NIMH IBSC MH64445 and NSF CISE IIS-0413211 grants