

Center for Cognitive Science

University at Buffalo, State University of New York

Wednesday, October 29, 2003

280 Park Hall
North Campus
2:00 pm –4:00 pm

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“Population Coding of Natural Scenes in Primary Visual Cortex”

We investigated the coding of natural scenes in primary visual cortex of the ferret using a new technique for multi-site recording of neuronal activity. This method allowed the simultaneous recording of neural activity from up to 60 separate sites on the cortical surface, with fidelity equivalent to a layer 2/3 recording, without penetrating the brain. At individual sites, evoked activity to natural scenes was only weakly correlated with the local image contrast structure that fell within the cells' classical receptive field and orientation/spatial frequency tuning. However, a population code, derived from activity integrated across cortical sites having retinotopically overlapping receptive fields, correlated strongly with the local image contrast structure. Center-surround interactions did not significantly alter these correlations. Cell responses demonstrated high lifetime and population sparseness as well as high dispersal values, implying that the neural coding is highly efficient in terms of information processing. These results indicate that while cells at an individual cortical site do not provide a reliable estimate of the local contrast structure in natural scenes, the integrated response of cells across distributed, but retinotopically overlapping, cortical sites is closely related to this structure in the form of a sparse and dispersed code.

Refreshments will be available
Everyone is welcome!

For information please call the Cognitive Science Office at (716) 645-3794 or check
<http://www.cogsci.buffalo.edu/cogsci/html/2002fall.htm>

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