Speaker       Rufin Vogels, Katholieke Universiteit Leuven  
Time          4pm, Departmental Tea immediately following.  
Date          Friday, 8 February 2008  
Place         BCS Auditorium, 46-3002  
Title         Stimulus selective adaptation in macaque inferior  
temporal neurons: fMRI, Local field potentials and  
spiking activity.

Abstract:
Repetition of a stimulus reduces the response in many cortical areas. This  
adaptation effect has been observed at the single cell level in macaques as  
well as in fMRI signals in humans. This adaptation effect has been used in  
fMR-Adaptation (fMR-A) studies to infer neuronal stimulus selectivities in  
human cortex. Inferring neuronal selectivities from fMR-A, however, requires  
an understanding of the relationship between the stimulus selectivity of  
neuronal adaptation and responses, which can be studied by measuring  
directly neuronal activity in monkeys. We demonstrated that monkeys show  
fMRI adaptation in inferior temporal (IT) cortex using the same adaptation  
protocol and visual stimuli as in human fMRI. Subsequently, we recorded  
spiking activity in the IT region of macaques that shows fMRI adaptation,  
investigating the relationship between stimulus selectivity of adaptation and  
responses. As expected, repetition of identical object images reduced the  
spiking activity of single IT neurons. Presentation of an image to which the  
neuron was unresponsive did not alter the response to a subsequent image  
that activated the neuron. Successive presentation of two different images to  
which the neuron responded similarly produced adaptation, but less so than  
the repeated presentation of an image. Thus neuronal adaptation at the single  
cell level showed a greater degree of stimulus selectivity than the responses.  
Furthermore, we measured the effect of adaptation on the shape tuning of  
spiking activity and local field potentials in macaque IT cortex. For both  
neuronal activity measures, the degree of shape tuning was unaffected by  
adaptation. The adaptation effect was greater when repeating a less effective  
shape than when that shape followed the most effective one, indicating that  
the degree of adaptation depends on the relation between test and adapter  
shape and not only on the response to the adapter. I will discuss the  
implications of these findings for mechanisms of adaptation as well as for the  
interpretation of fMR-A data.