



brain+cognitive sciences

2008 MIT-BCS Vision Series

Speaker Yaoda Xu, Yale University
Time 12pm.
Date Friday, 25 April 2008
Place BCS Auditorium, 46-3002
Title Dissociable parietal mechanisms supporting visual object individuation and identification.

Abstract:

Many everyday activities, such as driving on a busy street, require the encoding of distinctive visual objects from crowded scenes. Given resource limitations of our visual system, one solution to this difficult and challenging task is to first select individual objects from a crowded scene (object individuation) and then encode their details (object identification). Using functional magnetic resonance imaging (fMRI), I recently identified two distinctive parietal brain mechanisms that support these two stages of visual object processing. While the inferior intra-parietal sulcus (IPS) selects a fixed number of about 4 objects via their spatial locations, the superior IPS encodes the features of a subset of the selected objects in great detail. Thus the inferior IPS individuates visual objects from a crowded display and the superior IPS participates in subsequent object identification. Consistent with this theory, I will show that object individuation in the inferior IPS is sensitive to perceptual grouping cues between objects, and object identification in the superior IPS may play a key role in binding multiple independent object features together. These findings advance our understanding of the role of the parietal cortex in visual cognition and can explain deficits in object perception after bilateral parietal lesions in humans. These results also have significant implications to cognitive theories on visual object perception and can account for a number of (sometimes puzzling) behavioral findings as well as bridge studies on the development of object concepts in infants.