

Selected Publications

Ison MJ, Quian Quiroga R, Fried I. (2015) Rapid Encoding of New Memories by Individual Neurons in the Human Brain. *Neuron*, 87 (1): 220-230.

Suthana NA, Parikshak N, Ekstrom AD, **Ison MJ**, Knowlton BJ, Bookheimer SY, Fried I. (2015) Specific Responses of Human Hippocampal Neurons are Associated with Better Memory. *PNAS USA*, 112 (33): 10503-10508.

Kaunitz L, Kamienskowski JE, Varatharajah A, Sigman M, Quian Quiroga R, **Ison MJ**. (2014) Looking for a face in the crowd: fixation-related potentials in an eye-movement visual search task. *NeuroImage*, 89: 297-305.

Ison MJ, Mormann F, Cerf M, Koch C, Fried I, Quian Quiroga R. (2011) Selectivity of pyramidal cells and interneurons in the Human Medial Temporal Lobe. *J Neurophysiology*, 106: 1713-1721.

Ison MJ, Quian Quiroga R. (2008) Selectivity and invariance for visual object perception. (Review article) *Frontiers in Bioscience*, 13: 4889-4903.

Bonn Lecture Series in Neuroscience



Building Memories: Sparse Coding and Learning of Associations by Single Neurons in the Human Brain

Matias J Ison, Msc PhD

University of Leicester, UK

Monday, October 26th 2015, 16:30h

Life & Brain Center

Seminar Room, Ground Floor

It's been ten years since the discovery of concept cells, neurons in the human brain that respond selectively to pictures of specific individual and places. Concept cells have mostly been observed in the hippocampus and adjacent structures in the medial temporal lobe, the brain's main engine for episodic memory formation. However, the involvement of selective concept cells in memory circuits has remained elusive. We found that a large proportion of neurons initially responsive to one picture started firing to the associated one but not to others after learning. These neurons have expanded their selectivity to encode specific associations within a few trials and even after one trial. Our results provide a key neural substrate for the rapid inception of associations that is crucial for the formation of episodic memories.