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University of Leicester

Distinguished Visiting Professors - Seminar Series

Professor Walter J. Freeman

University of California, Berkeley

"How brains create knowledge from information"

Friday 7th June 2013, 2:00pm

Lecture Theatre 2, Bennett Building

The scalp and cortex lie like pages of an open book on which the cortex enciphers vast quantities of information and knowledge. They are recorded and analysed as temporal and spatial patterns in the electroencephalogram and electrocorticogram. In this talk I will describe basic tools and concepts needed to measure and decipher the patterns extracted from the EEG and ECoG. The deciphered patterns reveal neural mechanisms by which brains process sensory information into percepts and concepts. I will describe the brain as a thermodynamic system that uses chemical energy to construct knowledge.

Professor Walter J. Freeman
Division of Neurobiology
University of California,
Berkeley.

Walter J Freeman studied physics and mathematics at M.I.T., electronics in the Navy in World War II, philosophy at the University of Chicago, medicine at Yale University, internal medicine at Johns Hopkins, and neuropsychiatry at UCLA. He has taught brain science in the University of California at Berkeley since 1959, where he is Professor of the Graduate School.

Dr. Freeman received his M.D. cum laude in 1954, and he has more than 20 awards, among which are the Bennett Award from the Society of Biological Psychiatry in 1964, a Guggenheim in 1965, the MERIT Award from NIMH in 1990, and the Pioneer Award from the Neural Networks Council of the IEEE in 1992. He was President of the International Neural Network Society in 1994, is Life Fellow of the IEEE, and Chair, IEEE Oakland-East Bay Section, EMBS, 2006.

He has authored over 450 articles and 5 books: "Mass Action in the Nervous System" 1975, "Societies of Brains" 1995, "Neurodynamics" 2000, "How Brains Make Up Their Minds" 2001, and "Imaging brain function with EEG" 2013, with Rodrigo Quian Quiroga. His research aim is to understand the ways in which the immense numbers of neurons in the human brain cooperate and coordinate their activities in creating intelligent behaviour. He uses recordings of the action potentials and electric field potentials in animals and scalp EEG from human volunteers to get the data needed to build theories of brain function. Furthermore, he uses the brain theory to design and refine the electrode arrays that are necessary to observe and measure the spatial patterns of neural activity that create and control intentional behaviour.