

## Short CV of Luciano Fadiga

Born in 1961, M.D. University of Bologna, Ph.D. in Neuroscience University of Parma. Full Professor of Human Physiology at the Medical School of the University of Ferrara and Senior Researcher at the Italian Institute of Technology. From 2015 he is Coordinator of the IIT@UniFe Center for Translational Neurophysiology. Formerly fellow at the University of Parma since 1992. Assistant Professor at the University of Parma since 1997. Associate Professor of Human Physiology at the University of Ferrara (2000-2005). He has a long experience in electrophysiology and neurophysiology in monkeys (single neurons recordings) and humans (transcranial magnetic stimulation, study of spinal excitability, brain imaging, electrophysiological recordings).

Among his contributions are:

-The description of the functional properties of the monkey ventral premotor cortex where in collaboration with his Parma colleagues he discovered a class of neurons that respond both when the monkey performs actions and when it observes similar actions made by other individuals (mirror neurons). It has been suggested that these neurons unify perception and action and may contribute to others' action understanding.

-The study of peripersonal space representation in monkey premotor cortex. According to these findings, premotor area F4 contains polymodal neurons (motor, somatosensory and visual) coding the peripersonal space in motor coordinates. This stream of research exerted influence on the understanding of human pathological signs such as the visuotactile extinction following parietal lesions.

-The first demonstration that a mirror system exists also in humans. He achieved this result by applying transcranial magnetic stimulation (TMS) on the hand motor cortex of human subjects while they were observing others' actions. He demonstrated that the amplitude of observer's hand muscle potentials, as evoked by TMS, was specifically and significantly modulated by the observed actions.

-The demonstration that a similar motor resonance is activated during speech listening and involves tongue-related motor centers. He recently further demonstrates that this motor activation evoked by speech listening is functional to speech perception. This result shows for the first time a causal relationship between action representation and perception.

-The first demonstration that, in humans, the frontal area for speech production (Broca's area) is activated by action observation and that this activation reflects a primary role played by this area in pragmatically understanding actions of others.

Currently:

-He continues his research on monkey ventral premotor cortex (to elucidate the physiological mechanisms at the basis of mirror neurons visuomotor response) and on humans (by TMS and fMRI, to reveal the link

between action representation and language).

-He coordinates a project on neurorehabilitation of stroke patients by action observation.

-He is leading a group of researchers at the Italian Institute of Technology to investigate the possibility to establish hardware communication between the human brain and some artificial device (brain-machine interfaces). To this purpose he has acquired skills in single neurons recording and stimulation in awake neurosurgery patients. This work has led to the creation of a new IIT Center in Ferrara, in collaboration with Unife, for Translational Neurophysiology.

-He is currently PI in two EU funded Projects (EnTimeMent and Cobra). He was coordinator an EU funded Integrated Project on the brain basis of action and language grammars (Poeticon++). He has been PI in several other EU projects (Poeticon, Siempre, RobotCub, Neurobotics, Mirror), of seven PRIN and one FIRB projects (Italina Ministry of University). He was co-investigator in Human Frontier Science Program and McDonnell-Pew funded projects.

Luciano Fadiga is reviewer of many international journals in the field of Neuroscience and associated editor of some of them. He has been member of the SH4 Panel of the European Research Council (ERC) in 2009-2011 and Chair of the same Panel in 2012-2014. He has been invited to give talks and plenary lectures by several International Centers and Institutions. He has published more than 200 peer-reviewed papers on International Journals. His work has received more than 45,000 citations (H-Index 68, GS).

Ferrara, 10/05/2021

A handwritten signature in dark ink, reading "Luciano Fadiga". The signature is written in a cursive, flowing style with a large initial 'L' and 'F'.