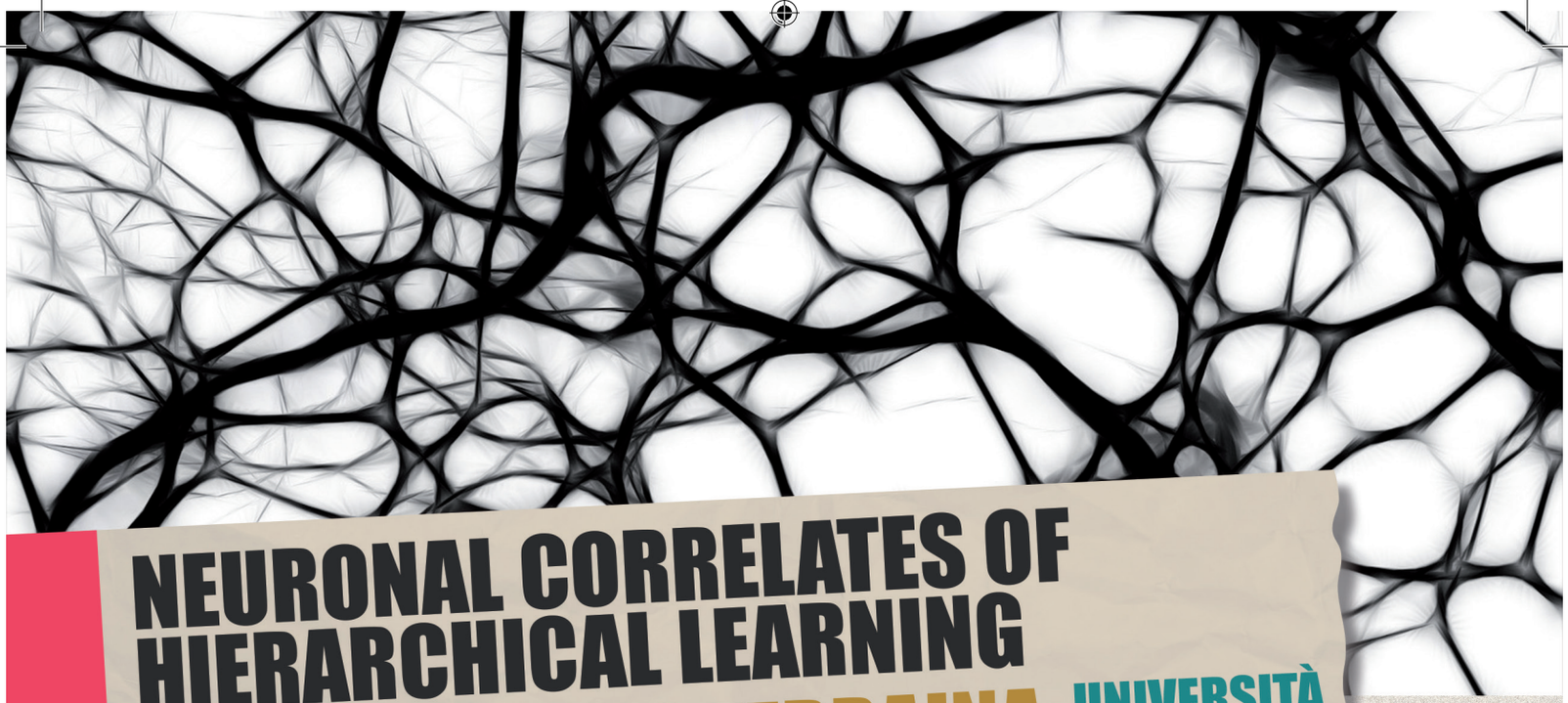


NEURONAL CORRELATES OF HIERARCHICAL LEARNING

A TALK BY STEFANO FERRAINA

UNIVERSITÀ LA SAPIENZA

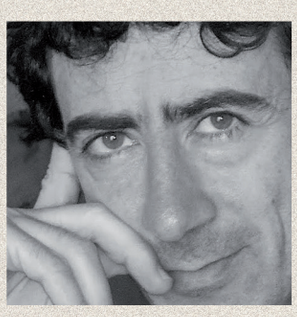
26 APRILE

14:30

AULA SEMINARI VIMM
FONDAZIONE RICERCA BIOMEDICA AVANZATA
VIA ORUS, 2
PADOVA

We continuously process and organize sensorial information to extract relationship between objects and to infer data not immediately available. Such ability allows the selection of appropriate actions at lower costs than trial-and-error strategies. Several species of animals share with humans this ability and use it for selecting the best opportunity to obtain food or to keep away dangerous situations. Monkeys, for instance, easily represent member's position within the hierarchy of social groups avoiding to unnecessary fight for food resources or reproductive strategies.

Transitive inference (TI) tasks have been developed to describe both humans and animals performance during relational reasoning. In a typical TI task a sequence of items is arbitrarily rank ordered (e.g., A>B>C>D>E>F), and subjects are required to learn the reciprocal relationship between the adjacent items by selecting the one of each pair that delivers a positive feedback (i.e. choose the higher between A and B or between B and C). Once premises of TI are acquired, i.e. the performance on each adjacent pair is optimal, subjects are tested with non-adjacent items to study how they use the learned information to select responses not directly driven by the sensory evidence (i.e. choose the higher between B and D or between B and E). The observation of a symbolic distance effect, i.e. the increase of accuracy and speed of responses for larger distances between the items to be compared, favored the hypothesis that subjects use spatially organized mental lines to represent the rank ordered sequences. In the talk I will present recent data obtained with high-resolution neuronal recording in two areas of the frontal lobe, the Prefrontal cortex and the dorsal Premotor area. Results suggest that neurons in the frontal lobe support the construction of an abstract, mental schema of ordered items. I'll also discuss the evidence that the TI task provides an optimal approach to the study of dynamical decision-making being motor actions in TI performed under variable levels of uncertainty.



Stefano Ferraina, MD, PhD, is is full Professor of Neurophysiology at the Department of Physiology and Pharmacology, Sapienza University, Rome. Area of expertise: basic and clinical neurophysiology, neuroanatomy, neuronal bases of visuomotor transformations, cognitive control of movement, single unit activity, multiunit activity and local field potential recording in behaving monkeys, neural population decoding, neuropsychology. Most of the current projects have the main goal to find the best decoding algorithm for the population dynamics during sensory-motor transformations in the domain of cognitive motor control.

Un ciclo di seminari organizzato da

PADOVA NEUROSCIENCE CENTER
UNIVERSITÀ DEGLI STUDI DI PADOVA

seminario Ferraina.indd 1 17/04/2018 18:32:36