



ACCADEMIA
NAZIONALE DEI LINCEI
CENTRO LINCEO
INTERDISCIPLINARE
"BENIAMINO SEGRE"



PADOVA
neuroscience
CENTER



UNIVERSITÀ
DEGLI STUDI
DI PADOVA

23 MARCH 2023, 3:00 pm

SALA SEMINARI VIMM

(Via Giuseppe Orus 2, Padova)

PNC SEMINARS

A talk by **Giovanna Citti (University of Bologna)**

A GEOMETRIC MODEL OF HAND AREA OF THE MOTOR CORTEX

In this seminar I present a geometric model of the motor cortex, joint work with Mazzetti and Sarti. The first studies of this area, due to Georgopoulos *et alii*, proved that neurons are sensible to kinematic variables, as for example direction of motion, velocity or acceleration. More recently, it has been experimentally proved by Churchland *et alii* and by Harpaz *et alii* that the selectivity of neurons changes in time, giving rise to selectivity of short trajectories of the hand, called movement fragments. These fragments can be obtained via a clustering procedure directly on the neural activity.

We consider here the space of the observed kinematic variables: these variables are related by differential constraints which allow to induce a metric on the space, called sub-Riemannian. We will recover the movement fragments as integral curves of vector fields defined in the considered structure. We will use the distance of the space to define a kernel and a kernel PCA, and we will obtain in the space of kinematic variables the same decomposition obtained on the neural activity. In this way we characterize a set of variables sufficient to describe this processing in this area.

"Padova Neuroscience Center – PNC"
email: administration.pnc@unipd.it; phone: +39 (0)49 8212623
www.pnc.unipd.it