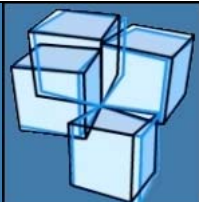






Muenster, Germany  
february 9-10, 2009



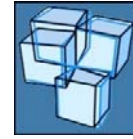


WP-4: Sensorimotor integration  
WP-5: Human behavior and neural  
correlates of multisensory 3D  
representation

Patrizia Fattori  
Nicoletta Marzocchi  
UNIBO



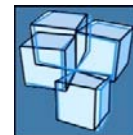
## Aim of the work UNIBO



UNIBO expertise:  
experimental (neurophysiological) approach to the link  
between perception and action

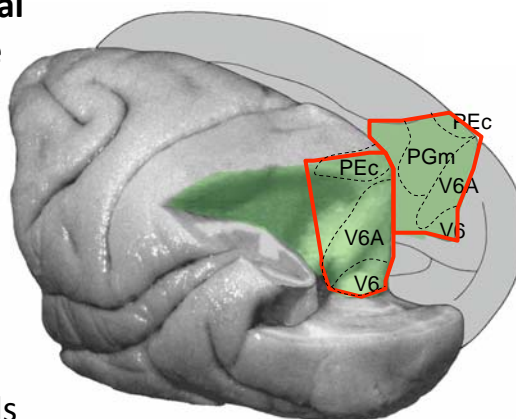
Main goal:  
experimental characterization of the neural correlates of  
multisensory 3D representation, in order to provide  
architectural guidelines for the production of biologically-  
inspired artificial intelligence systems able to interact  
with the 3D world

## Ground elements (1)

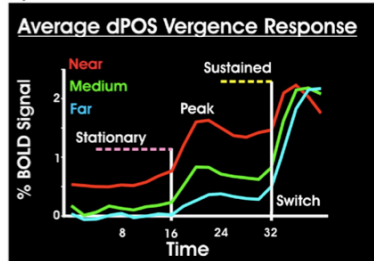
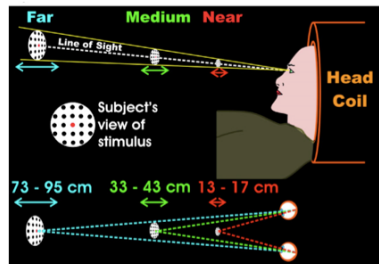
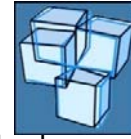


**Medial parietal occipital  
cortex is a crucial node  
for visuomotor  
integration processes.**

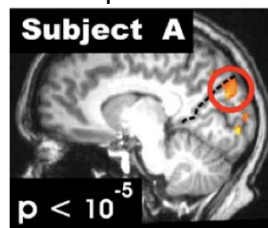
- Visual responses
- Eye-position signals
- Eye movements
- Arm movements
- Proprioceptive signals



## Ground elements (2)

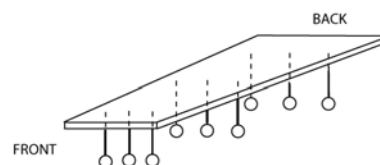
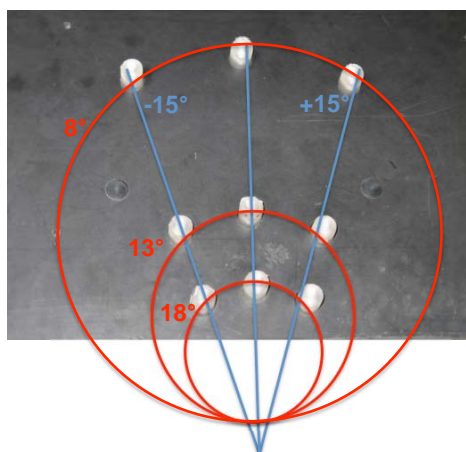
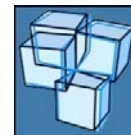


The dorsal parieto-occipital sulcus (dPOS) in humans shows a near-space preference (perhaps driven largely by vergence angle) and may provide areas in the dorsal visual stream with spatial information useful for guiding actions toward targets in depth.



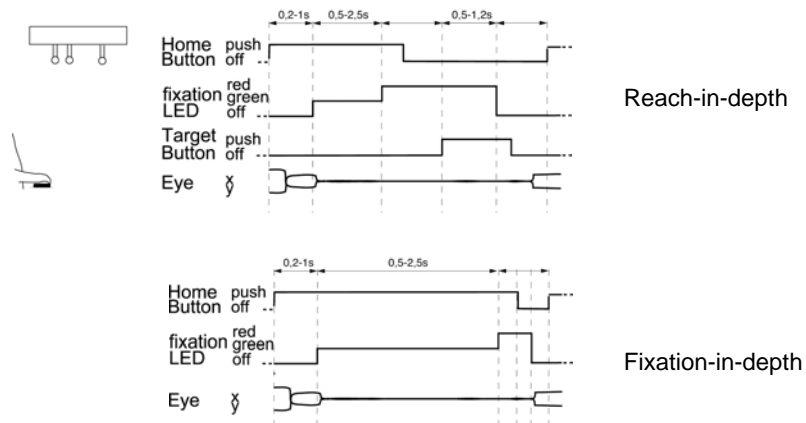
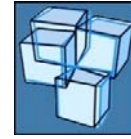
Quinlan et al., 2007

## Experimental set-up: reach-in-depth device



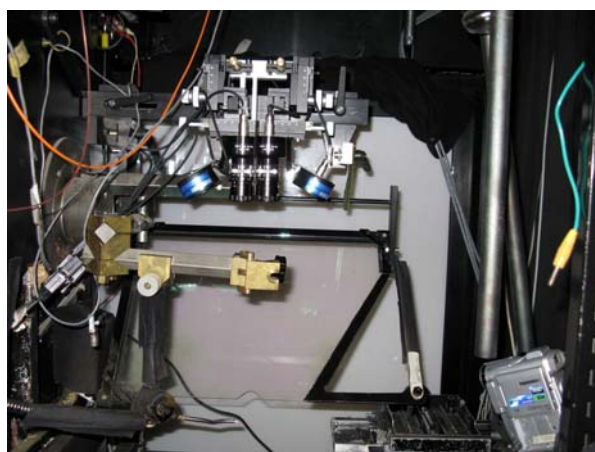
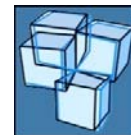
M6.ante: delivery date month 8

## Experimental set-up: reach-in-depth device



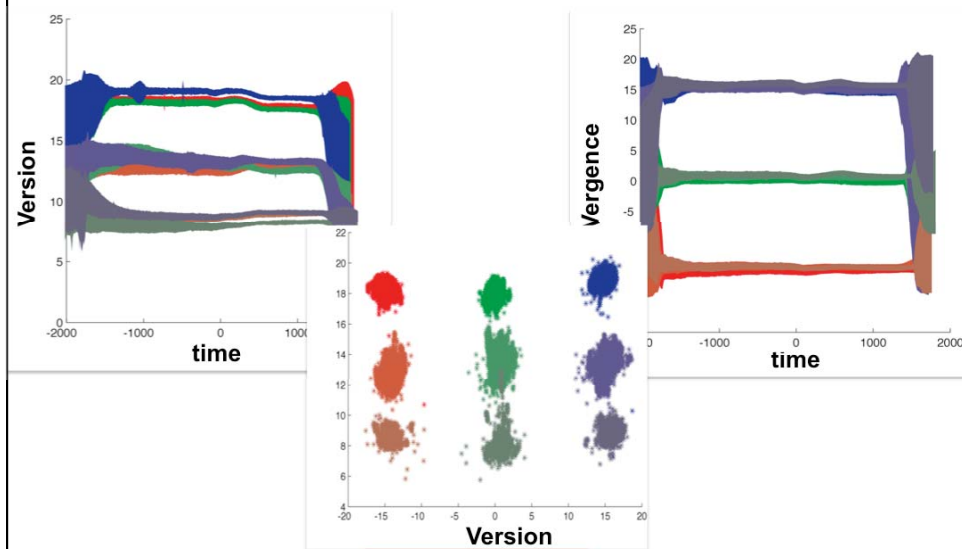
M6.ante: delivery date month 8

## Monkey training

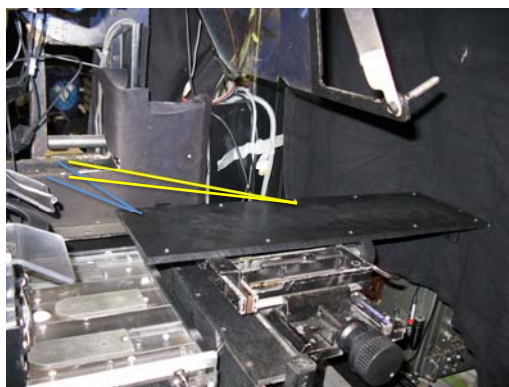
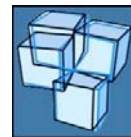


M6 : delivery date month 15

## Experimental set-up: binocular eye-tracking system

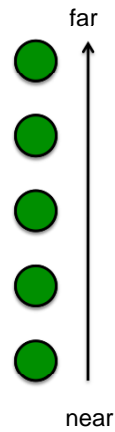
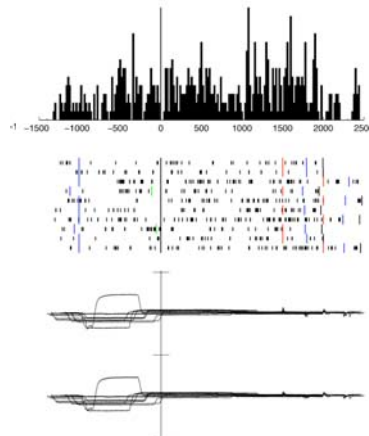
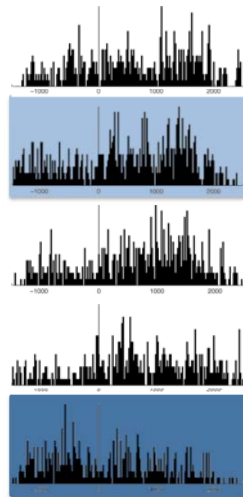
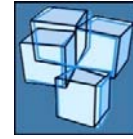


## Preliminary data: fixation-in-depth

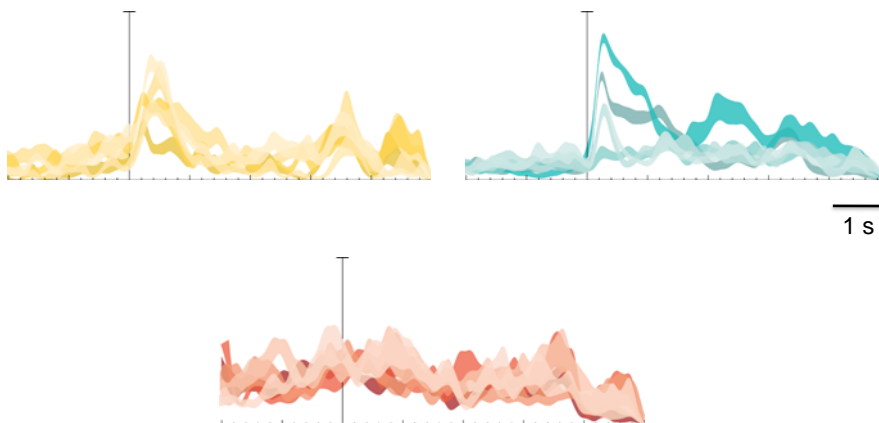
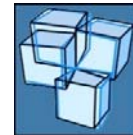


- Prototype device:  
5 LEDs along the straight-ahead direction
- 40 neurons tested

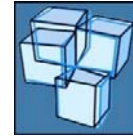
## Preliminary data: fixation-in-depth



## Preliminary data: fixation-in-depth

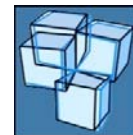


## Conclusions



- All the objectives of the first year achieved with no delays.
- Ready to start recordings 2 or 3 months in advance with respect to workplan

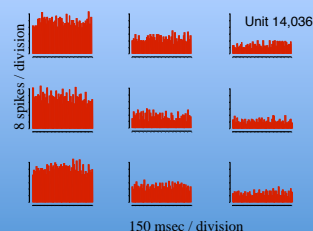
## Ongoing collaborations



UNIGE: definition of the parameters of version and vergence for buildign the set-up for experimental data collection.



UNIGE: sharing of experimental data in 2D (gaze fields and gain fields) to be modelled by UNIGE.



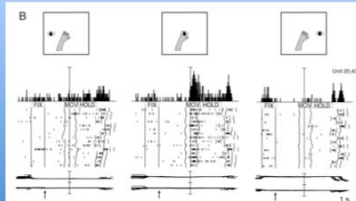
150 msec / division

Galletti et al., 1995

## Ongoing collaborations



UJI: reaching movements to foveal and peripheral targets.



UJI: reaching movements in dark and in light.

