CIMeC Research Seminars 2013

11 December 2013 10.00
Mattarello Seminar Room Basement

Speaker:

- Jason A. Martin, Centre for Neurology, University of Tübingen.

Title: **Its not simply grasping; Knowing makes the difference.**
Abstract:
The implementation of movement kinematics is typically associated with dorsal parietal structures in the brain. Whilst the anterior intraparietal sulcus (aIPS) has been associated with reach-to-grasp movements to objects, of different sizes and orientations, independent of non-spatial features (i.e. colour or surface patterns). That said, neurophysiological data from monkeys has shown that neurons in the dorsal parietal cortex encode an object's colour if this information has relevance for a particular task. Everyday objects provide lots of task-relevant information. I will talk about an experiment in which we examined whether the aIPS shows different signal levels when grasping everyday objects in comparison to grasping simple cuboids.
Hosted by: Angelika Lingnau

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5 December 2013 11.00
Palazzo Fedrigotti, Seminar Room, 3rd floor, Rovereto
Speaker:

- Dr. Steven Poulter, Durham University, UK

Title: **Components of Spatial Learning in the Rat**
Abstract:
The study of spatial memory in rodents using tightly controlled navigation tasks has proved insightful to our understanding of the behavioural changes in, and neurobiology of, learning, memory and cognition. However, despite a prevalence of tasks designed to investigate spatial memory it is still not known exactly how animals solve such tasks. On the face of it, experimental procedures such as the Morris water navigation task offer a relatively simple operational means to clarify this uncertainty. In reality however, a whole suite of interrelated functions must work in concert in order for an animal to acquire and express a learned spatial behaviour. My work investigates the nature of how navigational systems interact in the rat (Rattus norvegicus), and the neural structures that support these interactions. The first section of the talk will focus on how a system supporting geometry learning interacts with a system supporting learning based on non-geometric cues. The findings from two experiments reveal that rats are capable of rapidly integrating geometric and featural cues in a single exposure to the compound. The second section focuses on the interaction between a navigational system supporting allocentric learning (distal room cues) and one supporting cue response learning (proximal landmark). The results from a series of experiments support the notion that hippocampus-dependent place learning and striatal-dependent cue response learning can compete for behavioural control. The final section of the talk addresses the role of the hippocampus in spatial memory. Findings are presented demonstrating that, under certain training conditions, the hippocampus is not critical for the acquisition of a place solution but is more likely involved in a path integration process. This result holds important implications for the role of the hippocampus in knowing where versus getting there.
Hosted by: Sang Ah Lee

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3 October 2013 14.30
Palazzo Fedrigotti, Sala conferenze affrescata, 1° floor, Rovereto

Speakers:

- Mamiko Koshiba, Saitama Medical University, Japan
- Shun Nakamura, Tokyo University of Agriculture and Technology, Japan

Title: **Domestic chick and common marmoset models with multivariate analysis for development of pediatric psychiatry treatment**

Abstract:

The main symptoms of psychiatry are usually difficulties in social communication. Adult psychiatry may be caused by generation of vulnerability in early life. Complexity in defining the quality and extent of th social difficulties in terms of behaviour hampers the precision of diagnostic comprehension and treatment intervention.

Animal models to understand the emotional alteration through social communication behaviours have contributed preclinical studies for finding treatments. We are also approaching to analyse how animal and human participants produce social-context dependent behaviours allowing researchers to interpret the socio-emotional valence of behaviours with evaluating of statistical models.

The comprehension algorithms are explored through the visualisation of behaviour features in a statistically constructed space using a method called the 'Behaviour Output analysis for Quantitative Emotional State Translation (BOUQUET)'. This is based on principal component analysis in two developmental model animals: domestic fowl chicks (Gallus gallus domesticus) and common marmosets (Callithrix jacchus). We designed sensing systems to record longitudinally.

BOUQUET, graphical presentation of a time-dependent multivariate correlation visualised a trajectory of socio-emotional development, a susceptible period of social learning, brain region-specific molecular dynamics and nutritive effects in peripheral molecules and physiology on socio-emotional behaviour.

Further application of BOUQUET on a preterm infant inside an incubator of Neonatal Intensive Care Unit preliminarily suggested the behavioural diversification different from other primitive reflexes, which seemed much premature than chicks or marmosets. It is going for the translation of infant emotion with clinical information referring to comparative animal studies.

We expect such sensing systems in all life to support our communication in all species, gender, generations and environments *on the earth*.

Hosted by: Giorgio Vallortigara