Date, time: 15/10/24, 17:00-18:00
Place: Universiteit van Amsterdam, Room A1.11 at Science Park 904

Speaker: Demetrio Ferro, PhD
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Abstract:
From attention to intention: how covert and overt gaze behavior implements the selective encoding of reward variables

During cognitive experiences, the brain keeps track of multiple cognitive items, implementing coding schemes for information processing and storage. The selective focus on alternative items is often supported by the sequential processing of task relevant features at multiple levels in the canonical cortical hierarchy. Starting at the input end of the cognitive system, visual attention facilitates the selective processing of attended information across cortical structures. My previous work[1] in macaque Local Field Potential signals (LFP) shows that covert visual attention increases LFP power in higher frequency ranges, enhances the feed-forward flow of attended stimuli information within V1 laminar depths, and strengthens bidirectional flows between V1 and V4 in higher LFP frequencies. At the other end, the output of our cognitive evaluations is expressed in our motor actions. In reward-based decision-making, alternative choice options are sequentially evaluated before reaching commitment. Using a free viewing paradigm, my recent work[2] shows that monkey subjects tend to overtly direct their gaze toward the locations of most valuable reward options. This tendency coincides with the activation of the selective encoding of gazed reward value in the orbitofrontal cortex. Aligning the neural data to gaze shift initiation allowed to assess that shifts to the location of previously sampled, preferred items can trigger the reactivation of their value, even after breaking fixation to sample alternative items, and even at delay times when the items are no longer visually available. Furthermore, the neural tuning of value-encoding cells also correlates with their tuning for motor choice reports, possibly paving the way to deeper investigations about the attentional and intentional selective processing interplay. Future work will focus on the role of selective processes in focal encoding by combining the results from covert attention and overt gaze shifts.

1. D. Ferro, T. Cash-Padgett, M. Zhe-Wang, B. Y. Hayden, R, Moreno-Bote, Gaze-centered gating, reactivation, and reevaluation of economic value in orbitofrontal cortex, *Nature Communications*, 15:6163, 2024
2. D. Ferro, J. van Kempen, M. Boyd, S. Panzeri, A. Thiele, Directed information exchange between cortical layers in macaque V1 and V4 and its modulation by selective attention, *PNAS*, 118(12), e202297118, 2021

The speaker will be on site starting from 15:30, feel free to reach out and chat beforehand.