

## Introductory Remarks to Symposium 6

## Sensing LOOPS: cortico-subcortical interactions for adaptive sensing, perception and learning?

Markus Rothermel and Julio Hechavarría, Magdeburg and Frankfurt/Main

This symposium aims to highlight recent progress in the understanding of cortico-subcortical interactions and their functions across species and sensory modalities. The symposium also aims to update the German Neuroscience Community about the work conducted by the DFG Priority Program SPP 2411 "Sensing LOOPS".

In the symposium we will discuss the idea that bidirectional interactions between cortical and subcortical brain areas (termed "cortico-subcortical loops") represent an important processing component that allows for adaptive sensing, occurring in the form of context-dependent neural processing, prediction, attention, learning, and plasticity. How exactly these forms of adaptive sensing are implemented at the neural level has only started to be understood, as our ability to record neural activity from multiple brain areas has immensely improved in recent years by the application of next-generation imaging and electrophysiological techniques. This symposium features outstanding researchers at different career stages working on different sensory systems and species but on the same problem: cortico-subcortical loops. Manahan-Vaughan (Bochum) will speak about context-dependent processing in the rodent somatosensory system; Krug (Magdeburg) will talk about cortico-subcortical connections in the primate brain; Despatin (Aachen) will speak about multisensory integration in the frontal cortex and superior colliculus; Jaramillo (Chicago) will discuss computational models for studying cortico-subcortical loops; and de Hoz (Berlin) will speak about cortico-subcortical networks for auditory processing. Together, these talks will deliver an overview of the experimental and theoretical methods available for studying cortico-subcortical brain loops and their functions.

## Symposium 6

Wednesday, March 26, 2025  
14:30 - 16:30, Lecture Hall 9

Chairs: Markus Rothermel and Julio Hechavarría,  
Magdeburg and Frankfurt/Main

- 14:30 **Welcome and Opening Remarks**  
Markus Rothermel and Julio Hechavarría
- 14:35 Denise Manahan-Vaughan, Bochum  
CONTEXT-DEPENDENT CORTICOFUGAL CONTROL BY THE SOMATOSENSORY CORTEX OF THALAMIC INFORMATION PROCESSING (S6-1)
- 15:00 Kristine Krug, Magdeburg  
HIERARCHICAL AND RECIPROCAL CONNECTIONS FOR VISUAL COGNITION IN THE PRIMATE BRAIN (S6-2)
- 15:25 Alice Despatin, Aachen  
MULTISENSORY INTEGRATION AND MODALITY-SPECIFIC DECISION-MAKING IN FRONTAL CORTEX AND SUPERIOR COLLICULUS (S6-3)
- 15:35 Jorge Jaramillo, Chicago, USA  
A COMPUTATIONAL FRAMEWORK FOR SUBCORTICAL-CORTICAL INTERACTIONS IN COGNITION (S6-4)
- 16:00 Livia de Hoz, Berlin  
THE SOUND OF NOISE IN CORTICO-SUBCORTICAL LOOPS (S6-5)
- 16:25 **Discussion and concluding Remarks**