

***Talk on Tuesday, 11. June 2024***

***in HS 424***

***Start: 10:15 (till 11.30)***

***The talk will be presented in English***

# **Tool Embodiment: Repurposing a body-based computation to sense with a tool**

**Prof. Dr. Luke Miller**

**Radboud University**



It is often claimed that tools are embodied by their user, but whether the brain actually repurposes its body-based computations to perform similar tasks with tools is not known. In the present talk, I will discuss my recent research that aims to fill this gap. As a case study, I will focus on the sensorimotor ability to localize touch on limbs and tools. I will first discuss research suggesting that the computation of 'trilateration' plays a role in localizing touch on the body. In trilateration,

the location of touch on a limb is computed by integrating estimates of the distance between sensory input and its boundaries (e.g., elbow and wrist of the forearm). As evidence of this computational mechanism, we find that tactile localization on fingers and arms is most precise near its boundaries and lowest in the middle. These findings provide a computational target by which to compare localizing touch on tools. In a large sample of participants, we find that localizing touch on a tool also produces the signature of trilateration, with highest precision close to the base and tip of the tool. A computational model of trilateration provided a good fit to the observed localization behavior. In total, these findings suggest that brain repurposes trilateration to localize touch on a tool, despite large differences in initial sensory input compared to touch on the body. I will speculate a bit about possible neural mechanisms for overcoming these differences, allow the brain to map the space of bodies and tools similarly.

Invited by: Tobias Heed