

***Talk on Tuesday, 7. October 2025***

***Start: 10:15 till 11.30 Uhr***

***in HS 424***

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

# **How Predictive Processing and Prefrontal Cortex Functions Interact —**

## **from Development to Brain Simulation and Local Sleep**

**Prof. Dr. Dezső Németh**

**Neuroscience Research Center in Lyon (CRNL)**



Human learning and predictive processing rely on multiple cognitive systems associated with distinct brain structures. These systems do not always cooperate; they sometimes compete to optimize performance. Research suggests that reducing the engagement of prefrontal cortex-mediated explicit and attentional processes can enhance non-declarative learning.

In this talk, I will present findings from four studies—on non-invasive brain stimulation, functional brain connectivity, lifespan development, local sleep, and mind-wandering—exploring the competitive interaction between implicit statistical learning and prefrontal executive functions. Our results highlight the competitive nature of cognitive systems and their implications for improving learning and predictive processing."

### **Speaker:**

Dezső Németh is a full professor and team leader at the Neuroscience Research Center in Lyon (CRNL), INSERM, France. He earned his Ph.D. in 2005 from Eötvös Loránd University (ELTE), Budapest, and subsequently rose through the ranks to Assistant and Associate Professor at the University of Szeged, Hungary. In 2008, he joined the Department of Neuroscience at Georgetown University, Washington, D.C., where he worked with Professor Michael Ullman on procedural memory and language. In 2012, he was a researcher in Professor Russell Poldrack's

laboratory at the Brain Imaging Center, University of Texas at Austin. Németh's research explores the neurocognitive mechanisms of non-declarative memory, procedural learning, and predictive processing. He received Hungary's most prestigious neuroscience research grant, the Hungarian Brain Research Program of the Hungarian Academy of Sciences (2015), and the Award for Excellence in Teaching for outstanding instruction and student mentoring. Appointed full professor at ELTE in 2017, he was awarded the IDEXLYON Fellowship (1.2 M €) in 2018 and relocated to Lyon. In 2022, he was appointed to the highly competitive Chaire Professeur position at INSERM. He has published over 100 peer-reviewed papers as first, last, or corresponding author and continues to lead pioneering research on learning, memory consolidation, and predictive processing. Web: <https://nemethlab.com/>