

# 248<sup>th</sup> WPI-IIIS Seminar

## The Brain on Coffee, Sleep, and Alcohol

Adenosine is a central neuromodulator linking sleep pressure, cognitive performance, and the effects of psychoactive substances such as caffeine and alcohol. This talk summarizes key findings from molecular imaging and neurophysiological studies on adenosine receptor function in the human brain. It explores how sleep deprivation alters adenosine signaling and synaptic density, how caffeine counteracts sleep pressure by antagonizing adenosine receptors, and how alcohol interferes with these same systems, often impairing cognition. By integrating evidence from PET imaging, behavioral measures, and sleep research, the lecture highlights adenosine as a unifying mechanism underlying wakefulness, performance, and brain plasticity.



**Dr. David Elmenhorst**

Team Leader, Forschungszentrum  
Jülich, Germany

Date: **Friday, February 20, 2026**

Time: **9:00 – 10:00**

Venue: **1F Auditorium, IIIS Building**

\* On-site participation only



Contact: International Institute for Integrative Sleep Medicine, University of Tsukuba  
029-853-5857 (ext.5857) | [wpi-iiis-alliance@ml.cc.tsukuba.ac.jp](mailto:wpi-iiis-alliance@ml.cc.tsukuba.ac.jp)