

Invitation

to the Physiology Seminar

Priv.-Doz. Dr. Frank Biedermann

Institute of Nanotechnology (INT),
Karlsruhe Institute of Technology (KIT)

<https://biedermann-labs.com/en/>



Supramolecular Sensing Systems for the Detection of Small Metabolites in Biological Samples

Supramolecular sensing systems represent a complementary approach for molecular diagnostics, particularly for the detection of small metabolites that are often difficult to address with antibody-based assays and require substantial effort in chromatographic analysis. Such systems may offer advantages in terms of chemical robustness, short response times, and flexible manufacturing. However, insufficient binding strength and selectivity toward structurally similar small molecules remain key limitations of many synthetic receptors.

In this lecture, we present supramolecular concepts based on macrocyclic chemosensors and hybrid nanoporous materials designed to address these challenges. We focus on medically relevant targets including the neurotransmitter serotonin, its metabolic pathway involving tryptophan and 5-hydroxyindoleacetic acid (5-HIAA), the polyamine spermidine, and the clinically used drugs amantadine and memantine. Proof-of-concept studies demonstrate detection in urine, saliva, and blood at physiologically relevant concentrations, and we discuss realistic opportunities and current limitations for diagnostic applications.

Date: **Tuesday, 24th of February 2026**

Place: **Lecture Hall H**

Building: **I01-01-1110**

Scheduled at: **16:15**

Guests are welcome!

Contact:

Prof. Dr. Evgeni Ponimaskin, Department of Neurophysiology, Phone: 4858

<https://www.mhh.de/cnp>