



Universität Stuttgart



# Kolloquium des Fachbereichs Mathematik

Es spricht am Montag, 27. November 2023 um 16:00 Uhr

**Professorin Nicole Radde** (Universität Stuttgart)

zum Thema: „**Modeling and simulation of cellular systems - Using mathematical models to transform data into understanding**“

## Abstract:

In this talk I present results from interdisciplinary projects in my research group. These include (i) data-based modeling approaches for a synthetic epigenetic memory system in *E. coli* that can turn transient input signals into persistent DNA methylation patterns. Our model describes the response of the system to different input triggers and aids a robust design process. We use theory of hysteresis-based oscillations to couple the positive feedback memory module with a slower negative feedback in order to generate self-sustained oscillations. Moreover, we extend our ordinary differential equation model to capture cellular heterogeneity across a population of cells quantified by single cell distribution dynamics. This is a cooperation with Prof. Albert Jeltsch (Institute for Biochemistry and Technical Biochemistry). (ii) Methodology to capture heterogeneity and stochasticity observed in cell populations and in biomedical studies on animals and humans. This ranges from Bayesian workflows for the processing of sparse and highly heterogeneous time series data to upscaling approaches for the simulation and analysis of stochastic biochemical reaction networks. Here we collaborate within the DFG research unit QualPerf ‚Quantifying Liver Perfusion-Function Relationship in Complex Resection - A Systems-Medicine Approach‘ and with colleagues in the Department and in SimTech

Der Vortrag findet im Sitzungssaal 8.122 der Fakultät Mathematik und Physik, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen statt. Interessenten sind herzlich eingeladen!

Die Dozentinnen und Dozenten des Fachbereichs Mathematik