

# Quantum. Cognition. Behavior.

Friday, May 17, 2019 9:00–12:30

SR001, Konrad-Zuse-Haus, A.-Einstein-Str. 22, 18059 Rostock

## Overview

Algorithmic data analysis of human behavior has many important applications in cognitive sciences, health care, and dementia research. Finding models that adequately represent the dynamics of behavior, cognitive processes, and cognitive decline is, however, a formidable challenge. Recently, computational concepts based on physical paradigms – such as quantum computation or multiset rewriting – are being investigated as a basis for behavior models. In this colloquium, we want to discuss such modeling ideas and application challenges. We aim to move forward the understanding of how physical and mathematical models of computation can be employed to understand human behavior and cognition.

This colloquium is organized jointly by the Mobile Multimedia Information Systems Group (Computer Science, Rostock University; MMIS), the German Center for Neurodegenerative Diseases Rostock (DZNE), and the Communication Engineering Group (Brandenburg University of Technology Cottbus-Senftenberg; CE).

## Session 1: 09:00–10:30

- The BTU Cognitive Center.  
*Ronald Römer (CE)*
- The Quantum Mouse:  
Modeling knowledge representation and ontology inferences in a quantum cognition framework.  
*Ronald Römer & Peter beim Graben (CE)*
- Segmentation of multivariate time series by the recurrence structure analysis.  
*Peter beim Graben (CE)*

## Session 2: 11:00–12:30

- Analyzing the behavior of people with dementia – research at MMIS.  
*Sebastian Bader (MMIS)*
- Recursive Bayesian State Estimation using Lifted Probabilistic Multiset Rewriting.  
*Stefan Lüdtke (MMIS)*
- Understanding way-finding behavior in people with dementia: cognition and spatial orientation.  
*Chimezie Obioma Amaefule (DZNE)*
- Automated detection of neurodegeneration in MRI data using deep learning:  
Focusing on model comprehensibility and explainability.  
*Martin Dyrba (DZNE)*