

# A U S H A N G

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## FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

# DISPUTATION

**Montag, 11. Juli 2022, 10:00 Uhr**

[WebEx](#)

**Disputation über die Doktorarbeit von**

**Herrn Jan-Hendrik Niemann**

Thema der Dissertation:

**Learning Reduced Models for Large-Scale Agent-Based Systems**

Thema der Disputation:

**Decentralized and Distributed Optimization**

Die Arbeit wurde unter der Betreuung von **Prof. Dr. C. Schütte** durchgeführt.

Abstract: Many modern problems are studied through data analysis, often involving very large data sets. In fact, in the early 2000s the world faced an explosion in size and complexity of data which has led us to the age of "Big Data". Optimization has become the tool to extract information from data and make predictions. Traditional methods, however, can encounter difficulties when the size of the data exceeds a certain size or when the data is distributed over a network and cannot be collected centrally, for example, for data protection reasons. As a result, parallel and distributed methods are becoming increasingly important, for example, for using further computational resources or for ensuring data protection by keeping data local.

In this talk, I discuss two approaches which lead to decentralized and distributed optimization algorithms where so-called "agents" solve the problem cooperatively. I first introduce the Alternating Direction Method of Multipliers (ADMM) and show how it can be used to solve optimization problems in a decentralized manner. Then, I present a cooperative algorithm for fully distributed optimization and illustrate it with an example.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

**Interessierte werden hiermit herzlich eingeladen**

Der Vorsitzende der Promotionskommission  
Prof. Dr. C. Schütte