

A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

DISPUTATION

Donnerstag, 12. Oktober 2017, 15.00 Uhr

Ort: Arnimallee 6, Raum 032, 14195 Berlin

Disputation über die Doktorarbeit von

Frau Alexandra-Mirela Reimers

Thema der Dissertation:

**Understanding metabolic regulation and cellular resource allocation
through optimization**

Thema der Disputation:

Inference of logical rules for metabolic pathway activation

Die Arbeit wurde unter der Betreuung von **Prof. Dr. A. Bockmayr** durchgeführt.

Abstract: Many tools from linear and combinatorial optimization can be used to model and predict the behavior of living organisms. In this talk, I show how the constraint-based approach "Resource Balance Analysis" and combinatorial optimization techniques help to infer the logical rules governing the activation of metabolic pathways in living cells in response to diverse extracellular conditions. I explain how one can use the concept of monotone extensions of partially defined Boolean functions to understand the structure of the regulatory network of cells. The application of the method on *Bacillus subtilis* central carbon metabolism reveals known regulations as well as a means to study lesser known parts of the global regulatory network of this organism.

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. A. Bockmayr