

## FREIE UNIVERSITÄT BERLIN Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

# DISPUTATION

**Montag, 11. Mai 2015, 15.15 Uhr**

**Ort: Pi-Gebäude, Raum 108/109, Arnimallee 6, 14195 Berlin**

**Disputation über die Doktorarbeit von**

**Herrn Aljoscha Palinkas**

**Thema der Dissertation:**

**Integrated modelling of metabolic and regulatory networks**

**Thema der Disputation:**

**Optimality and trade-offs in evolution and mathematical models**

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

Abstract: Mathematical optimisation is a common tool used in systems biology to predict strategies of an organism to fulfil vital functions. In metabolism, such strategies can be given by flux distributions, which describe quantitatively how the different pathways are used. The adjustment of the organism to its environment and current requirements is often governed by several objectives and there is a trade-off in satisfying them.

Pareto optimality is a mathematical concept to deal with such situations and was also employed to explain experimentally observed occurrences of phenotypes. Also game theory was applied to analyse the interplay of different objectives. I will give several examples of trade-offs and their mathematical models. The question of yield vs. rate maximisation in metabolism resp. constraint-based models of metabolism will be discussed in more detail. This subject was intensely discussed in recent literature and is also related to the Warburg effect.

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