A U S H A N G

FREIE UNIVERSITÄT BERLIN
Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Dienstag, 9. September 2014, 11.00 Uhr

Ort: Pi Gebäude, Seminarraum 008, Arnimallee 6, 14195 Berlin

Disputation über die Doktorarbeit von

Herrn Johannes Schöneberg

Thema der Dissertation und der Disputation:

Reaction-Diffusion Dynamics in Biological Systems

Die Arbeit wurde unter der Betreuung von **Dr. F. Noé** durchgeführt.

Abstract: Biological Systems are based on the diffusional transport of molecules and the reactions between them. Experiments cannot simultaneously probe localizations and time sequences of all relevant molecular processes. A solution is to integrate experimental data in physically realistic computer models of the reaction kinetics. The result is an understanding of the fundamental processes in biology on a molecular scale.

I will first speak about reaction kinetics simulation in the context of the different scales that are present in biological systems (high/low particle numbers, high/low system homogeneity) and how these scales influence the simulation methodology that should be used. I will show an application example in synaptic vesicle endocytosis where processes require modeling on two different scales.

I will continue by introducing a new concept for reaction kinetics simulations: interacting particle reaction-diffusion (iPRD) simulations for the most detailed reaction kinetics. I will introduce iPRD theory and its implementation in the software package ReaDDy. I will conclude how this general tool can be applied to resolve the reaction-diffusion kinetics of the rod cell signal transduction cascade in vision.

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
Dr. F. Noé