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FAKULTÄT FÜR MATHEMATIK  
Dekan Univ.–Prof. Dr. Harald Rindler

Einladung zur öffentlichen Defensio von  
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Thema der Dissertation:

## **Cell Movement - Zooming In and Out**

Abstract:

My thesis deals with different aspects of cell movement, focusing on two topics: Actin-dependent single cell movement and the collective moving behavior of myxobacteria. This talk is devoted to the first topic, actin-dependent cell movement, in particular it is concerned with cells that crawl with the aid of a lamellipodium. This sheet-like structure consists of a network of actin filaments together with several accessory proteins. The basis of the works of this thesis with regards to this topic is the Filament Based Lamellipodium Model (FBLM). We made several modeling additions, for example detailed models describing the filament number and length regulation or adding a description of myosin. I will demonstrate that with these extensions the model is able to simulate the chemotactic behavior of cells, or the bistability of lamellipodial fragments; the latter we prove also mathematically. We also mathematically analyze a decoupled version of the filament number dynamics at the leading edge, proving the existence and uniqueness of stationary solutions and convergence to them.

Prüfungssenat:

Univ.-Prof. Dr. Josef Hofbauer (Vorsitz)  
(Universität Wien)

Univ.-Prof. Dr. Christian Schmeiser  
(Universität Wien)

Prof. Dr. Luigi Preziosi  
(Politecnico di Torino)

Univ.-Prof. Dr. Anton Arnold  
(Technische Universität Wien)

**Zeit:** Montag, 23. November 2015, 15:00 Uhr

**Ort:** Fakultät für Mathematik, WPI Besprechungsraum 08. Stock, Oskar-Morgenstern-Platz 1