FAKULTÄT FÜR MATHEMATIK
Dekan Univ.-Prof. Dr. Radu Ioan Bot

Einladung zur öffentlichen Defensio von

Steffen Plunder

Thema der Dissertation
Mathematical modelling and simulation of epithelial-to-mesenchymal transitions leading to cell migration

Abstract:

The primary project of this PhD thesis is the study of epithelial-to-mesenchymal transitions (EMT), which are complex cellular processes, playing a crucial role in neural tube formation and also occur in wound healing, fibrosis and the initial stage of metastasis.

Our mathematical model is a differential inclusion (i.e. a set-valued ODE),which is well-posed due to results from the theory of prox-regular sets. We used a new and very performant numerical method from computer graphics, called position-based dynamics (PBD). This allowed us to perform large scale parameter studies that lead to new biological hypotheses, which Eric Theveneau tested in his lab with in vivo experiments.

In a second project, we apply kinetic theory to a particle system with constraints. Such systems occur for example in muscle tissue models. Despite the constraints, we could show well-posedness and convergence of the mean-field limit.

Prüfungssenat
Univ.-Prof. Mag. Dr. Andreas Cap
(Vorsitz, Universität Wien)

Assoz. Prof. Sara Merino Aceituno, PhD
(Universität Wien)

Prof. Dr. Raluca Eftimie
(University of Franche-Comte)

Prof. Dr. Vincent Calvez
(Claude Bernard University Lyon 1)

Zeit:

Topic: thesis defense Steffen Plunder

Time: Jan 27, 2023 14:30 Vienna

https://univienna.zoom.us/j/65772338126?pwd=aEhFWldqUWMxVCtHSVRtaXVzRkErQT
09

Meeting ID: 657 7233 8126

Passcode: 143782