IQCB
Institute for Quantitative & Computational Biosciences

Cross Disciplines Seminar
February 26, 2025
10:30 AM

Lecture Hall (00.187) at BioZentrum I, Hanns-Dieter-Hüsch-Weg 15, 55128 Mainz

Prof. Dr. Andreas Deutsch

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Mechanisms of Tumor Heterogeneity

Insights from Mathematical Models

Tumor heterogeneity can be viewed as a collective phenomenon emerging from interactions between normal and malignant cells. As such, it can be studied using agent-based mathematical models, such as cellular automata. In this talk, I will present examples of these models to analyze the emergence of genotypic and phenotypic heterogeneity due to cellular interactions in growing tumors. I will also explore how these models help in understanding tumor evolution, clonal selection, and the role of the microenvironment in shaping heterogeneity.

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References

1. S. Syga, H. P. Jain, M. Krellner, H. Hatzikirou, A. Deutsch: Evolution of phenotypic plasticity leads to tumor heterogeneity with implications for therapy. PLOS Comp. Biol., 2024
2. A. Deutsch, J. M. Nava-Sedeño, S. Syga, H. Hatzikirou. BIO-LGCA: a cellular automaton modelling class for analysing collective cell migration. PLOS Comp. Biol. (6), 2021
3. O. Ilina, P.G. ..., A. Deutsch, P. Friedl. Cell–cell adhesion and 3D matrix confinement determine jamming transitions in breast cancer invasion. Nature Cell Biology 1103–1115, 2020
4. A. Deutsch, S. Dormann. Cellular automaton modeling of biological pattern formation: characterization, examples, and analysis. Birkhauser, Basel, 2018

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