

Mathematical modelling of cell movement in network tissues

Mini-course by Thomas Hillen

In current studies on cell movement in tissues, Friedl et al. have observed single metastatic cancer cells as they move through collagen network tissue. Cells use collagen fibres as directional guidance, but they also degrade the fibre network through the release of proteolytic enzymes. The development and analysis of a mathematical model for this type of mesenchymal motion is the focus of these three lectures:

Part I: Introduction to the problem, biological background, model development, simulations and pattern formation (joint work with K. Painter)

Part II: Complete analysis of the 1-D model, steady states, travelling waves (joint work with Z.A. Wang, and M. Li).

Part III: Analysis of the n-D model, existence, uniqueness, pointwise weak steady states and pattern formation, open questions (joint work with K. Painter, P. Hinow, and Z.A. Wang).