

Guest lecture

Computational Biology Workshop

Image-based modelling of cell dynamics



Professor Till Bretschneider

University of Warwick, UK.

Date: 14 May 2019

time: 10.00 – 12.00.

Place: BMB seminar room

Host: Veit Schwämmle, Thomas Koed Doktor and Daniel Wüstner, BMB

Description:

Modern live-cell fluorescence microscopy enables us to visualise dynamic cellular processes in unprecedented detail. I will present ongoing research projects which bring together i) image analysis methods for tracking cells and their movements, as well as for quantifying spatio-temporal patterns of fluorescently labelled cellular constituents, and ii) mathematical models to investigate regulatory mechanisms of cellular biochemistry and mechanics.

An outlook will be given on using generative adversarial networks for creating 3D synthetic cell images in order to test different methods for 3D segmentation and feature extraction.

- Sharon Collier, Peggy Paschke, Robert R. Kay and Till Bretschneider. [Image based modeling of bleb site selection](#). Scientific Reports, 7, 6692, 2017. doi: [10.1038/s41598-017-06875-9](#)
- Lockley R, Ladds G, Bretschneider T. [Image based validation of dynamical models for cell reorientation](#). Cytometry A. 2015 Jun;87(6):471-80. doi: [10.1002/cyto.a.22600](#).

This will be followed by a brief demo of our QuimP software for quantifying cellular morphodynamics, which consists of a set of plugins for ImageJ/Fiji.

Link to the QuimP

homepage: https://www2.warwick.ac.uk/fac/sci/dcs/people/till_bretschneider/quimp

Link to a recent QuimP application note: Piotr Baniukiewicz, Sharon Collier, and Till Bretschneider. QuimP – Analyzing transmembrane signalling in highly deformable cells. Bioinformatics, 34, 2695–2697, 2018. doi: [10.1093/bioinformatics/bty169](#)