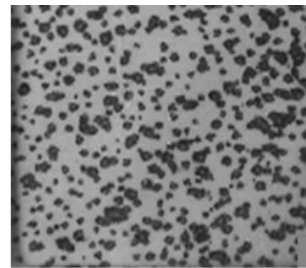
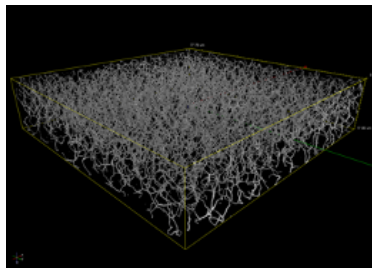


Spatio-temporal modelling combined with machine learning

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Traditionally, point pattern or other spatial data consist of one small 2D pattern but recently, large 3D and space-time data sets have become more and more common. Development of probabilistic models and statistical estimation procedures for such data sets are, therefore, needed. In this project, we will construct new spatial and spatio-temporal stochastic models for 2D and 3D spatial structures developing over time and develop methods to estimate the parameters of the models from data. The model construction will be guided by particular applications, for example, designing pharmaceutical coatings with tightly controlled drug release rates. However, the aim is to generate general models which are useful in a broad range of areas, including gel networks, fibre structures, and tree growth in forestry. In addition, the project may include development of model based machine learning methods, for example, to solve some image segmentation problems connected to the microscopy data of the coatings.



Examples of spatial data sets: pharmaceutical coating (left) and a snapshot of a series of images of activated sweat glands (right).