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Statistical Imaging – from Biophotonics to Biometric Identification

In this talk we will discuss various fundamental statistical concepts in the reconstruction process from noisy images as they occur in biophysical research. We argue that careful statistical modelling of prior knowledge is mathematically difficult and unpleasant but indispensible. This will be illustrated with some examples.

In the first part of the talk we consider prior information on jumps, edges and noise. To this end we introduce the concept of statistical multiscale analysis as a general tool for a statistically sound denoising process. We illustrate how this can be used for the automatic reconstruction of opening states of ion channel recordings. A second example is imaging in nanoscale fluorescence microscopy.

The second part deals with the analysis of fingerprints for the purpose of biometric identification. We show how prior information on specific features of fingerprints, such as connectivity of ridge lines improves current identification systems. In particular, we report on recent findings how modelling the growth of fingerprints improves identification of juveniles.

Host: Helmut Grubmüller

Large Seminar Room
Administration Building

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