

This thesis aims to provide an overview of real-time live-cell imaging methods with a focus on the signalling pathways. The first, most thorough section is about fluorescence methods and is followed by sections about bioluminescence and label-free methods. In the fluorescence section, we will at first introduce the types of fluorophores and respective labelling approaches. Subsequently, we will go through the individual techniques, starting with single-fluorophore and FRET biosensors, continuing with kinetic modelling approaches, a FLIM method used to detect changes in the cellular environment, and ending with two methods used to improve the resolution. With each technique, we will shortly explain the working principle and look at the examples at which this method was used. Finally, we will look at the example of live-cell imaging of one signalling cascade.