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# Development of image-analysis tools in the BioImaging and Optics platform (BIOp)

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One of the main objectives of the BioImaging and Optics platform (BIOp) of the EPFL is to offer users high quality support and instruments, on the microscopy side as well as on the image-analysis side.

Concerning the image analysis, we aim to develop engineer solutions to the effective requests of the core-facility users. Here, we present two applications for the microscopy imaging, implemented as Java plugins for ImageJ.

Grid Assembly answers to the exigency of obtaining single mosaics of large dimension, from the union of sets of non-overlapping tiles acquired in grid-mode. This operation is necessary when one needs both high resolution and a large field of view. The plugin stitches together the input images, performing background correction to compensate for the uneven illumination of the sample, and seams elimination. The correction for the background is achieved through a suitable filtering in the spatial domain, as the seams correction, or through the estimation of a parabolic background on the single tile, in a least squares sense.

Color Segment performs an interactive colour segmentation using on the input of the user who has to quickly indicate different colour area to segment. Two algorithms of classification are available: k-means and Hidden Markov Model (HMM). The k-means algorithm clusters the pixels of the image according to their distribution in the colour space, while the HMM approach introduces also spatial constraints. As result, the program generates automatically a segmented image based on the colour information which is very useful for e.g. histology images.