Correlative super resolution fluorescence microscopy using localisation and structured illumination techniques

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Super resolution techniques are allowing life scientists to gain insight into the nanometre domain using visible fluorescence. However, these techniques add a layer of complexity in sample preparation and image reconstruction that further removes the end result from a traditional image. The final image produced by techniques such as structured illumination microscopy (SIM) and localisation microscopy can significantly depend on parameters used in their respective image reconstruction algorithms. As such it is important to perform these reconstructions carefully and also to utilise multiple techniques in order to understand how the measurements reflect reality. Given the very different approaches and achievable resolutions of SIM and localisation microscopy it can be beneficial to use both to study the same sample.

We present results of imaging immunolabeled structures using direct Stochastic Optical Reconstruction Microscopy (dSTORM) and SIM. These samples were prepared on grided coverslips and imaged on our custom built microscopes. Image reconstructions were performed using open access and our own software and then cross-correlated to provide direct spatial comparison.