

Advanced Fluorescent Proteins for Optical Nanoscopy *By Gerd Ulrich Nienhaus*

In recent years, a variety of sophisticated microscope designs have been developed featuring spatial resolutions well below the Abbe limit, which truly justifies the use of the term 'optical nanoscopy'.

Genetically encoded fluorescent proteins (FPs) of the green fluorescent protein (GFP) family can be employed as minimally perturbing endogenous probes for live-cell imaging and are of key importance for super-resolution imaging. Genetic engineering of naturally occurring fluorescent proteins will likely continue to yield markers with improved and even entirely novel properties, which may considerably widen their range of applications.

We have characterized a large number of anthozoan FPs including red fluorescent and green-to-red photoactivatable variants. These have been cloned and subjected to further optimization using genetic engineering.

I will discuss recent biophysical characterizations of photoactivatable FPs using x-ray crystallography, bulk and single-molecule spectroscopy and also present applications in super-resolution imaging.