

MAR12-2011-005322

Abstract for an Invited Paper
for the MAR12 Meeting of
the American Physical Society

Beholding the subcellular world in your PALM: nanometer resolution optical measurements of protein assemblies in cells¹

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Key to understanding a protein's biological function is the accurate determination of its spatial distribution inside a cell. Although fluorescent protein markers enable specific targeting with molecular precision, much of this utility is lost when the resultant fusions are imaged with conventional, diffraction-limited optics. In response, several imaging modalities that rely on the stochastic activation and bleaching of single molecules, and that are capable of resolution 10x below the diffraction limit (250 nm for visible wavelengths), have emerged. This talk will cover superresolution imaging of biological structures using photoactivated localization microscopy (PALM). In addition to covering the theory, we will also discuss the use of the technique in understanding biological phenomena on the nanoscale, including the organization of bacterial chemoreceptors, the movement of actin in neuronal spines, and the stratification of focal adhesions.

¹This work was supported by the Intramural Research Programs of the National Institute of Biomedical Imaging and Bioengineering.