

MAR16-2015-004204

Abstract for an Invited Paper
for the MAR16 Meeting of
the American Physical Society

Understanding subcellular function on the nanometer scale in real time: Single-molecule imaging in living bacteria

JULIE BITEEN, Univ of Michigan - Ann Arbor

It has long been recognized that microorganisms play a central role in our lives. By beating the diffraction limit that restricts traditional light microscopy, single-molecule fluorescence imaging is a precise, noninvasive way to sensitively probe position and dynamics, even in living cells. We are pioneering this super-resolution imaging method for unraveling important biological processes in live bacteria, and I will discuss how we infer function from subcellular dynamics (Tuson and Biteen, *Analytical Chemistry* 2015). In particular, we have understood the mechanism of membrane-bound transcription regulation in the pathogenic *Vibrio cholerae*, revealed an intimate and dynamic coupling between DNA mismatch recognition and DNA replication, and measured starch utilization in an important member of the human gut microbiome.