Force nanoscopy in microbiology

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Microbial cells have developed sophisticated multicomponent structures and machineries to govern basic cellular processes, such as chromosome segregation, gene expression, cell division, mechanosensing, cell adhesion and biofilm formation. Because of the small cell sizes, subcellular structures have long been difficult to visualize using diffraction-limited light microscopy. During the last three decades, optical and force nanoscopy techniques have been developed to probe intracellular and extracellular structures with unprecedented resolution, enabling researchers to study their organization, dynamics and interactions in individual cells, at the single molecule level, from the inside out, and all the way up to cell-cell interactions in microbial communities. In this talk, I will discuss the principles of force nanoscopy techniques available in microbiology, and highlight some outstanding questions that these new tools have made possible to answer [1, 2].

[1] Dufrêne YF. Nat Rev Microbiol. 2004, 6, 451.
[2] Xiao J, Dufrêne YF. Nat. Microbiol. 2016, 1, 16186.