

Microfluidic Systems for Studying Bacteria Mechanobiology

CNF Project Number: 3229-24

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Primary CNF Tools Used: AJA Sputter Deposition, 2 Gamma tool, ASML tool, Oxford 81 or Oxford 82 PT770, Oxford, 100, Versalaser

Abstract:

In this project we seek to understand the biomechanical properties of individual bacteria as well as bacterial mechanobiology (the response of living bacteria to mechanical stimuli). We have four goals in this project: 1) to determine mechanical properties of bacterial cell envelope of various species; 2) to understand how to embed and maintain viable bacteria within rigid materials, the so-called “engineered living material.” 3) to utilize mechanical stimuli to promote biomineralization of ureolytic bacteria; and 4) to understand how bacteria grow into constricted space.

Summary of Research:

Currently, we are working on to demonstrate that mechanical stimuli can be used to promote biomineralization of ureolytic bacteria by using microfluidic device and genetically modifying a bacterial strain to link mechanosensitive gene to biomineralization gene. Additionally, we are working on to analyze how *S. aureus* grow and divide in a constricted space using the microfluidic devices manufactured at CNF. Since the inception of this project number we have been manufacturing devices with the help of Jay VanDelden (Eigenphase).

