

A multi-pronged approach against bacteria and biofilms

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With the goal of advancing the development of novel antimicrobial and antibiofilm agents, research in our group combines smart nanomaterial design and quantitative characterization of bacteria and bacterial biofilms. In this seminar, I will first focus on our progress in engineering smart nanomaterial-based antimicrobials (nano-antimicrobials) that target bacteria via multiple killing mechanisms. Concurrent with this effort in antimicrobial platform design, we also develop analytical tools to elucidate the mechanism of action of our engineered nano-antimicrobials. I will highlight the non-invasive assay we developed based on atomic force microscopy (AFM) quantitative imaging that allows us to measure the mechanical properties of biofilms with high spatial resolution. I will then end my talk with our exciting discovery that bacteria, akin to mammalian cells, respond to the stiffness of the underlying substrate by adjusting their cell envelope elasticity.

