University of Texas at San Antonio

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3:15 p.m.-4:15 p.m.
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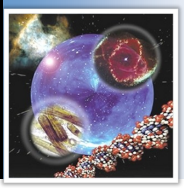
Soft Matter Physics and Bacteria

One of the long term challenges in human health and disease is the control of pathogens, such as antibiotic-resistant forms of bacteria. In this talk, we will briefly describe two directions where soft condensed matter physics based approaches have been useful.

Bacterial biofilms are structured multi-cellular communities that are notoriously resistant to antibiotics. We translate bacteria movies into searchable databases of bacterial behavior and find an unexpected diversity in motility driven by Type IV pili across different bacterial species. The associated phenomena include 'stick-slip' motion analogous to earthquake dynamics, and self-organized distribution of resources in early biofilm development reminiscent of capitalist economies.

We examine the mechanism of a range of pore-forming polypeptides, including antimicrobial peptides, cell penetrating peptides, viral fusion peptides, and apoptosis proteins, and show how a combination of topology, coordination chemistry, and materials science can be used to approach a unified understanding.



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