
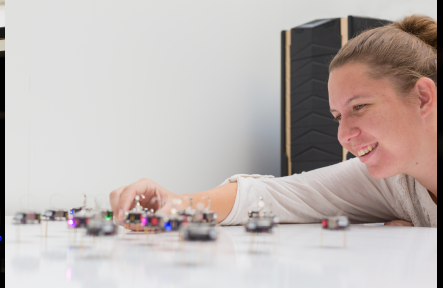


Physics colloquium

Infections may resist the immune system using soft-matter mechanics

Vernita Gordon
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Date: **2/1/19**
Time: **10:00 AM**
Location: **COB2 170**

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Abstract:
Biofilms are communities of interacting microbes that are embedded in a matrix of polymers and proteins. Bacteria in biofilms have a greatly-enhanced resistance to antibiotics and to the immune system, and as a result most chronic infections are in the form of biofilms. We have shown that years-long biofilm infections in the lungs of patients with Cystic Fibrosis evolve to change their production of matrix polymers in a way that promotes mechanical toughness. How mechanical toughness might benefit biofilm infections has not been known. We have developed a new method for assaying how the viscoelastic mechanics of a target much larger than an immune cell could impact the immune cell's ability to remove and engulf part of the target. Using freshly-isolated human neutrophils and gels the re-create the range of elasticities that we previously measured for biofilms, we demonstrate that pieces of soft gel targets are readily removed and engulfed, but stiff gel targets are entirely resistant to attacks by neutrophils. This gives a new perspective on the importance of biofilm mechanics and suggests new approaches to treating biofilms.

Bio:
Vernita Gordon is an Associate Professor of Physics at the University of Texas at Austin, where she has been on the faculty since 2010. She did her undergraduate work in physics and mathematics at Vanderbilt University and her graduate work in physics at Harvard. Her research group studies the interplay of physics and biology in developing and mature bacterial biofilms.