

“Soft, Wet and Sticky: Viscous Forces and Elasticity in Wet Adhesion”

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3:00 pm

Wu and Chen Auditorium
Levine Hall



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Abstract

Understanding and harnessing the coupling between lubrication pressure, elasticity, and surface interactions provides materials design strategies for applications such as adhesives, coatings, microsensors, and biomaterials. This presentation will discuss our efforts to understand how soft materials make contact and adhere under dynamic conditions in fluid environments. Measurements of interactions between soft surfaces will show how elastic films deform due to viscous forces and influence adhesion. In particular, we will discuss conditions under which elasticity favors both dynamic and static adhesion in fluid environments. In the second part of the presentation, we will show practical implications for adhesives on soft surfaces such as skin. More specifically, we will discuss how the presence of water influences contact formation and the performance of adhesives. We will also show qualitative differences in debonding mechanism caused by the elasticity of the substrate.

Bio

Joelle Frechette received her PhD from Princeton University in Chemical Engineering and Materials Science in 2005, studying surface forces and adhesion in electrochemical environment. After postdoctoral work at UC Berkeley where she investigated unwanted adhesion in microelectromechanical systems, she joined the Hopkins faculty in 2006. Joelle Frechette was awarded the NSF CAREER Award in 2008, the 3M Non-Tenured Faculty Award in 2008, the ONR Young Investigator Award in 2011, and was elected as a Fellow of the American Chemical Society in 2017. Her research interests in the area of colloid and interfacial science include adhesion in fluid environments, particles at fluid interfaces, and surface force measurements.