

Abstract Submitted
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Static and Dynamic Capillary Forces in Pollen Adhesion and Detachment CARSON MEREDITH, DONGLEE SHIN, HAISHENG LIN, Georgia Tech — Nature provides remarkable examples of adhesive bioparticles including diatoms, pollens, and fungal spores, which are robust examples of nature's solutions to particle adhesion. These particles' interactions are often mediated by liquid films at micro- and nanometer length scales, and their study can lead to new physical insights into confined fluids. This talk will detail recent discoveries of the wet adhesive mechanisms of pollen, which provide useful insights into the role of capillary forces and confined fluids in nature. In particular, we describe how pollenkitt, a viscous fluid coating many pollen particles, forms nanoscale capillary bridges that mediate the adhesion and detachment of pollens from surfaces of insects and plants. We will present experimentally observed static and dynamic regimes of pollenkitt capillary forces. Models are utilized to understand the role of rheological properties of pollenkitt in creating these forces. Importantly, the forces generated by pollenkitt give pollen attachment and release from surfaces a sensitive dependence on humidity, rate, and surface morphology. This talk will explore how the physics of these forces contributes to pollination in nature and how they might be harnessed to engineer new materials.

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