Control over adhesion of bacteria on solid and liquid interfaces underlies a spectrum of practical applications, ranging from preventing the formation of destructive biofilms on medical devices and on resource pipelines to removing pollutants from water. Because microscale bacteria are similar in size to colloidal particles, bacterial adhesion has long been studied using models for colloidal deposition. Many bacteria, however, are active and can move, swim, tumble, and rotate near interfaces. This activity, not captured in models for deposition of passive colloids, must affect how bacteria deposit onto surfaces. Here, I will describe work exploring effects of motility on adhesion to solid substrates and to liquid-liquid interfaces. On solid surfaces, we relate near-surface mobility and adhesion to surface properties using imaging; engineer bacteria to identify surface adhesins that control transient mobility; and apply insights from these studies to design responsive polymer brush surfaces that detach adherent bacteria. On liquid-liquid interfaces, we test the applicability of thermodynamic pictures for adhesion of non-motile bacteria on oil droplets; identify how bacterial swimming alters this adhesion; and show that motile adhered bacteria can drive droplet rotation.