

While many are familiar with the basic capabilities of atomic force microscopy (AFM), few realize the full potential of the instrument. My lab studies a variety of material systems with scanning probe microscopy. We investigate charge carrier motion in organic semiconductors and colloidal quantum dots. We study ferromagnetic nanostructures by passing a current through the metal tip to create a local circular field, and use magnetic force microscopy to measure the resulting magnetic states. We study the adhesion of bacteria by growing biofilms on the tip and bringing them into contact with chemically modified surfaces. I will highlight examples from my work while discussing how to think about novel and less frequently used capabilities of AFM.