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### **Single Molecule Manipulation**

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Single-molecule manipulation studies open a door for a close-up investigation of complex biological interactions at the molecular level. In these studies, single biomolecules are pulled while their force response is being monitored. The process is often nonequilibrium, and interpretation of the results has been challenging. We used the atomic force microscope to pull proteins and DNA, and determined the equilibrium properties of the molecules using the recently derived nonequilibrium work theorem. I will present applications of the technique in areas ranging from fundamental biological problems such as DNA mechanics, to complex medical processes such as the mechanical activation of von Willebrand Factor, a key protein in blood coagulation.