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What Do We Measure With Single-Molecule Force Spectroscopy?
CHING-HWA KIANG, NOLAN HARRIS, ERIC BOTELLO, WEI-HUNG CHEN, Rice University — Single-molecule force spectroscopy is a powerful technique for studying detailed intra- and inter- molecular interactions by manipulating single biomolecules at the nanometer scale. Force is measured while one pulls on the molecules. However, relating the measured information to equilibrium thermodynamic properties is challenging. Jarzynksi's equality allows one to reconstruct the free energy surface as a function of molecular end-to-end distance[1,2]. Using protein folding as an example, we studied the parameters that influence the unfolding process, such as pulling velocity, tempearture, and chemical denaturant concentration in the solution, to demonatrate that valuable equailibrium thermodynamic information can be obtained using this technique. 1. N. C. Harris, Y. Song, and C.-H. Kiang, *Phys. Rev. Lett.*, **99** 068101 (2007). 2."Pulling Strings: Stretching Proteins Can Reveal How They Fold," **Science News**, **172** 22 (2007).

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