

Abstract Submitted  
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**Single-molecule kinetics under force: probing protein folding and enzymatic activity with optical tweezers** WESLEY WONG, Harvard University — Weak non-covalent bonds between and within single molecules govern many aspects of biological structure and function (e.g. DNA base-pairing, receptor-ligand binding, protein folding, etc.) In living systems, these interactions are often subject to mechanical forces, which can greatly alter their kinetics and activity. My group develops and applies novel single-molecule manipulation techniques to explore and quantify these force-dependent kinetics. Using optical tweezers, we have quantified the force-dependent unfolding and refolding kinetics of different proteins, including the cytoskeletal protein spectrin in collaboration with E. Evans's group [1], and the A2 domain of the von Willebrand factor blood clotting protein in collaboration with T. Springer's group [2]. Furthermore, we have studied the kinetics of the ADAMTS13 enzyme acting on a single A2 domain, and have shown that physiological forces in the circulation can act as a cofactor for enzymatic cleavage, regulating hemostatic activity [2]. References: 1. E. Evans, K. Halvorsen, K. Kinoshita, and W.P. Wong, Handbook of Single Molecule Biophysics, P. Hinterdorfer, ed., Springer (2009). 2. X. Zhang, K. Halvorsen, C.-Z. Zhang, W.P. Wong, and T.A. Springer, Science 324 (5932), 1330-1334 (2009).

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