Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

**An Atomic Force Microscopy based investigation of specific biomechanical properties for various types of neuronal cells** ELISE SPEDDEN, Physics and Astronomy, Tufts University, JAMES WHITE, Physics and Astronomy and Biomedical Engineering, Tufts University, DAVID KAPLAN, Biomedical Engineering and Chemical Engineering, Tufts University, CRISTIAN STAII, Physics and Astronomy, Tufts University — Here we describe the use of Atomic Force Microscope (AFM) based techniques to characterize and explore the influence of biochemical and biomechanical cues on the growth and interaction of neuronal cells with surrounding guidance factors. Specifically, we use AFM topography and AFM force spectroscopy measurements to systematically investigate the morphology, elasticity, and real time growth of neuronal processes in the presence of different types of extracellular matrix proteins and growth factors. We therefore create a series of systems containing specified neuron densities where the type of the underlying growth promoting protein is different from sample to sample. For each system we measure key biomechanical parameters related to neuronal growth such as height and elastic modulus at multiple growth points on several types of neurons. We show that systematic measurements of these parameters yield fundamental information about the role played by substrate-plated guidance factors in determining elastic and morphological properties of neurons during growth.

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Date submitted: 09 Nov 2011 Electronic form version 1.4