

Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Capturing mechanical properties of biological cells using coarse-grained modeling¹ WENBIN MAO, MONIQUE CHANG, ALEXANDER ALEX-EEV, Georgia Institute of Technology, Atlanta, Georgia — Understanding cell mechanics is important for a variety of biomedical applications. Our goal is to develop a coarse-grained computational model that can properly capture the micromechanics of biological cells. The coarse-grained cell model includes an elastic shell enclosing a cross-linked polymer network and a viscous fluid representing, respectively, cell membrane, cytoskeleton, and cytoplasm. We use this model to investigate the mechanical response of cells to external forces and compare the results with the experimental AFM measurements. We systematically vary the properties and structure of the internal polymer network and the outer membrane to assess their influence on the cell mechanical responses. This model not only reveals interesting insights into the cell mechanics, but also provides a promising tool for investigation of motile and multicellular systems.

¹Acknowledge financial support from NSF under Award No. 0932510

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Date submitted: 02 Aug 2013

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