1161-76-261 **Ehssan Nazockdast*** (ehssan@email.unc.edu). *Cell nucleus as a microrheological probe to study the rheology of the cytoskeleton.*

Mechanical properties of the cell are important biomarkers for probing its architectural changes caused by cellular processes and/or pathologies. Recent advancements in microfluidic and high-speed imaging technologies have enabled probing the cell cortex deformations in microchannels, while also tracking different intracellular components in high-throughputs. Most previous studies of cell mechanics using microchannels only measure the cell stiffness, and do not disentangle the rheology of different cellular components, including the cortex, the cytoplasm and the nucleus. We present a novel method that utilizes the correlation between the cortical deformations that are induced by external microfluidic flows, and the nucleus displacements, induced by those cortical deformations, to decouple the cell cortex and the cytoplasm mechanics. As a proof of concept, we consider a rigid spherical nucleus centered in a spherical cell. We obtain analytical expressions for the time-dependent nucleus velocity vs the cell deformations, when the interior cytoplasm is modeled as a viscous, viscoelastic, porous and poroelastic material, and demonstrate how the nucleus velocity can be used to characterize the linear rheology of the cytoplasm over a wide range of forces and timescales/frequencies. (Received August 18, 2020)