Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

High contrast single molecule tracking in the pericellular coat JAN SCRIMGEOUR, Department of Physics, Clarkson University, LOUIS T. MCLANE, JENNIFER E. CURTIS, School of Physics, Georgia Institute of Technology — The pericellular coat is a robust, hydrated, polymer brush-like structure that can extend several micrometers into the extracellular space around living cells. By controlling access to the cell surface, acting as a filter and storage reservoir for proteins, and actively controlling tissue-immune system interactions, the cell coat performs many important functions at scales ranging from the single cell to whole tissues. The cell coat consists of a malleable backbone - the large polysaccharide hyaluronic acid (HA) - with its structure, material properties, and ultimately its bio-functionality tuned by a diverse set of HA binding proteins. These proteins add charge, cross-links and growth factor-like ligands to the coat To probe the dynamic behavior of this soft biomaterial we have used high contrast single molecule imaging, based on highly inclined laser illumination, to observe individual fluorescently labeled HA binding proteins within the cell coat. Our work focuses on the cell coat of living chondrocyte (cartilage) cells, and in particular the effect of the large, highly charged, protein aggrecan on the properties of the coat. Through single molecule imaging we observe that aggrecan is tightly tethered to HA, and plays an important role in cell coat extension and stiffening.

Jan Scrimgeour
Department of Physics, Clarkson University

Date submitted: 13 Nov 2013 Electronic form version 1.4