Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Nanomechanical Response of Bacterial Cells to Antimicrobial Peptides RICHARD PARG, JOHN DUTCHER, University of Guelph — The effectiveness of antimicrobial compounds can be easily screened, however their mechanism of action is much more difficult to determine. Many compounds act by compromising the mechanical integrity of the bacterial cell envelope, and we have developed an atomic force microscopy (AFM)-based creep deformation technique to evaluate changes in the time-dependent mechanical properties of bacterial cells upon exposure to antimicrobial peptides [1]. Measurements performed before and after exposure, as well as time-resolved measurements and those performed at different antimicrobial concentrations, revealed large changes to the viscoelastic parameters including a distinctive signature for the loss of integrity of the bacterial cell envelope. Our previous experiments have focused on *Pseudomonas aeruginosa* PAO1 bacterial cells in Milli-Q water, for which the cells can withstand the large osmotic pressure. In the present study we have focused on performing the measurements in buffer to obtain more biologically relevant results. The AFM creep deformation measurement provides new, unique insight into the kinetics and mechanism of action of antimicrobial peptides on bacteria. [1] S. Lu, G. Walters, R. Parg and J.R. Dutcher, *Soft Matter* **10**, 1806-1815 (2014).

John Dutcher
University of Guelph

Date submitted: 14 Nov 2014 Electronic form version 1.4