Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

**Nanomechanical Response of *Pseudomonas aeruginosa* PAO1 Bacterial Cells to Cationic Antimicrobial Peptides** SHUN LU, GRANT WALTERS, JOHN DUTCHER, University of Guelph — We have used an atomic force microscopy (AFM)-based creep deformation technique to study changes to the viscoelastic properties of individual Gram-negative *Pseudomonas aeruginosa* PAO1 cells as a function of time of exposure to two cationic peptides: polymyxin B (PMB), a cyclic antimicrobial peptide, and the structurally-related compound, polymyxin B nonapeptide (PMBN). The measurements provide a direct measure of the mechanical integrity of the bacterial cell envelope, and the results can be understood in terms of simple viscoelastic models of arrangements of springs and dashpots, which can be ascribed to different components within the bacterial cell. Time-resolved creep deformation experiments reveal abrupt changes to the viscoelastic properties of *P. aeruginosa* bacterial cells after exposure to both PMB and PMBN, with quantitatively different changes for the two cationic peptides. These measurements provide new insights into the kinetics and mechanism of action of antimicrobial peptides on bacterial cells.

John Dutcher
University of Guelph

Date submitted: 09 Nov 2012 Electronic form version 1.4