Abstract Submitted
for the GEC11 Meeting of
The American Physical Society

Eradication of Bacterial Biofilms Using Atmospheric Pressure Non-Thermal Plasmas MAHMOUD YOUSEF ALKAWAREEK, BRENDAN GILMORE, SEAN GORMAN, Biomolecular Sciences Group, School of Pharmacy, Queen's University, Belfast, United Kingdom, QAIS ALGWARI, WILLIAM GRAHAM, Centre for Plasma Physics, School of Mathematics and Physics, Queen's University Belfast, Northern Ireland, UK, DEBORAH O'CONNELL, York Plasma Institute, Department of Physics, University of York, UK — Bacterial biofilms are ubiquitous in natural and clinical settings and form a major health risk. Biofilms are recognised to be the predominant mode of bacterial growth, and are an immunological challenge compared to planktonic bacteria of the same species. Eradication of biofilms with atmospheric pressure plasma jets is investigated. Cold non-equilibrium plasmas, operated at ambient atmospheric pressure and temperature, are efficient sources for controlled energy transport through highly reactive neutrals (e.g. ROS, RNS), charged particles (ions and electrons), UV radiation, and electro-magnetic fields. A focused panel of clinically significant biofilms, including Pseudomonas aeruginosa, Escherichia coli, Staphylococcus aureus, and Bacillus cereus, are exposed to various plasma jet configurations operated in helium and oxygen mixtures. Viability of surviving cells was determined using both standard plate counting method and XTT viability assay. These are correlated with measurements and simulations of relevant reactive plasma species.

Deborah O'Connell

Date submitted: 22 Jul 2011 Electronic form version 1.4