Abstract Submitted for the DFD07 Meeting of The American Physical Society

Driving Cell Seeding Using Vibration Induced Surface Waves HAIYAN LI, JAMES FRIEND, LESLIE YEO, MicroNanophysics Research Laboratory, Monash University — The ability to load cells into scaffold matrices is an important step in *in-vitro* cell culturing. Efficient and rapid cell seeding is however difficult and has traditionally been carried out using a static method by allowing gravity to drive the perfusion of the cell suspension into the porous scaffold. Nevertheless, due to the large capillary pressures associated with the small scaffold pore dimensions, the static cell seeding method is both slow and inefficient; the majority of cells are distributed close to the surface of the scaffold due to the inability of the fluid to penetrate deep into the scaffold. By driving the liquid into the scaffold using small amplitude surface vibrations on a piezoelectric substrate, we demonstrate that the cells can be infused much quicker (approximately 10 seconds) than if allowed to perfuse by gravity alone, which requires seeding times in excess of 30 minutes. Greater penetration of the fluid and hence the cells into the scaffold is also achieved with the vibration forcing, thus giving rise to a more uniform cell distribution within the scaffold. Moreover, we have verified that 80% of the yeast cells seeded by the surface waves remained viable.

> James Friend MicroNanophysics Research Laboratory, Monash University

Date submitted: 01 Aug 2007

Electronic form version 1.4