Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Label-free Screening of Multiple Cell-surface Antigens Using a Single Pore KARTHIK BALAKRISHNAN, UC Berkeley Department of Mechanical Engineering, MATTHEW CHAPMAN, UC Berkeley Biophysics Graduate Group, ANAND KESAVARAJU, UC Berkeley Department of Bioengineering, LYDIA SOHN, UC Berkeley Department of Mechanical Engineering — Microfluidic pores have emerged as versatile tools for performing highly sensitive measurements. Pore functionalization can result in slower particle transit rates, thereby providing insight into the properties of particles that travel through a pore. While enhancing utility, functionalizing with only one species limits the broader applicability of pores for biosensing by restricting the insight gained in a single run. We have developed a method of using variable cross-section pores to create unique electronic signatures for reliable detection and automated data analysis. By defining a single pore into sections using common lithography techniques, we can detect when a cell passes through a given pore segment using resistive-pulse sensing. This offers such advantages as 1) the ability to functionalize each portion of a pore with a different antibody that corresponds to different cell surface receptors, enabling label-free multianalyte detection in a single run; and 2) a unique electronic signature that allows for both an accelerated real-time analysis and an additional level of precision to testing. This is particularly critical for clinical diagnostics where accuracy and reliability of results are crucial for healthcare professionals upon which to act.

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Date submitted: 11 Nov 2011 Electronic form version 1.4