

Kent State University

Physics Colloquium

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**NANOBIOPHYSICS: USING NANOSTRUCTURES
TO EXPLORE MOLECULAR OR
CELLULAR BIOPHYSICS, AND HAVE FUN!**

Abstract

Nanoscale structures, given its simplicity in geometry in the forms of nanoslits, nanochannels, nanoconstriction and nanogap electrodes, nevertheless offer unique platforms for the study of molecular and cellular biophysics, with the potential for bioanalytical applications [1-3]. We recently established a single molecule tug-of-war (TOW) system to study entropy-driven DNA escape at micro-to-nanofluidic interfaces [4, 5]. For low-copy number molecular analysis, we developed two versatile analytical platforms for the manipulation and sensing of biomolecules, namely, the insulating nanoconstriction based molecular dam [6-8] and nanogap electrodes based molecular trap [9], both run under AC dielectrophoresis (DEP) for molecular manipulation. Further, nanoslits may also be used to study bacterial morphological plasticity under geometrical constraints without genetic alternation [10].

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