Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Controlled Translocation of ds/ss hybrid DNA through Solid State Nanopores with Tuning Fork based Force sensing Probe tip (SSN-TFFSP)[1] HARPREET KAUR, CHANGBAE HYUN, TAO HUANG, NATHAN WALSH, SANTOSHI NANDIVADA, RYAN ROLLINGS, MIN XIAO, DAVID MCNABB, JIALI LI, University of Arkansas at Fayetteville — Using a newly constructed apparatus that integrates a Solid State Nanopore (SSN) and Tuning Fork based Force sensing Probe tip (SSN-TFFSP), we studied ds/ss hybrid single DNA molecules. The ds/ss hybrid DNA is a 48.6 kb double-stranded λ DNA ligated to a 1kb single-stranded DNA. The λ DNA end was ligated to a biotinlated Oligo for attaching the hybrid DNA to a probe tip. The SSN-TFFSP apparatus combines the measurement of ionic current through a solid-state nanopore with a DNA tethered probe tip that is position controlled and sensed by a tuning fork force sensor and a nanopositioning system. The SSN-TFFSP system monitors the process of DNA molecules being captured and trapped by a voltage-biased nanopore, and the process of pulling the trapped DNA out of the nanopore with a controlled speed of 100 μs/base (1nm/ms) or slower. Here we report on the 3 signals measured simultaneously from this apparatus: ionic current through a nanopore, tip position, and tip vibrational amplitude during the process of a ds/ss hybrid DNA tethered to a Probe tip being captured and released by a nanopore

[1]This work is supported by a NHGRI (R21HG004776) Grant.

Harpreet Kaur
University of Arkansas at Fayetteville

Date submitted: 15 Nov 2013 Electronic form version 1.4