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Supporting Information

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Cross-Talk Between Ionic and Nanoribbon Current Signals in Graphene Nanoribbon-Nanopore Sensors for Single-Molecule Detection

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Figure S5. DNA translocation data from a nanopore next to a gold electrode. Top: TEM image of the nanopore next to the gold electrode. The spacing between the nanopore and the gold electrode is 20 nm. The nanopore diameter is 2.8 nm. The ionic current trace is in black, with a representative single translocation event shown on the right. The corresponding GNR current time trace is in red, below the ionic data. The salt concentration was 1 M KCl. V_{ionic} = 1 V and V_{ds} = 0 V.!

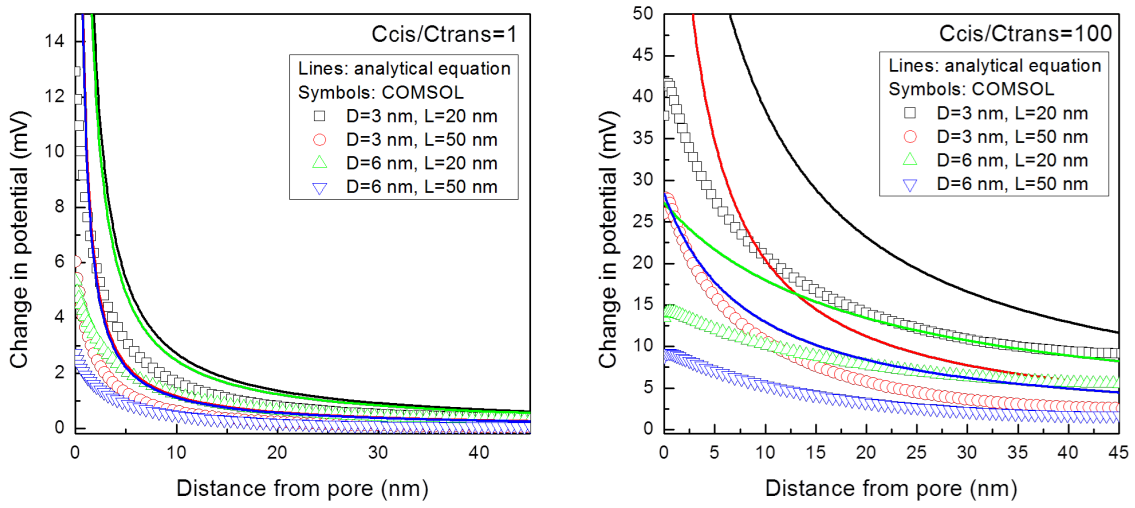

Figure S6. Comparison of analytic and numerical (COMSOL) potential field calculations for GNR-nanopore device. Analytical calculations based on Xie, *et.al* and COMSOL Multiphysics simulation based on Poisson's equation and Nernst-Planck equation were used to estimate the potential field change near a nanopore when DNA translocates through it, measured along the topside of the membrane from the edge of nanopore. The C_{cis}/C_{trans} was varied and the effect of the potential drop as a function of distance and nanopore dimensions was calculated. The two models differ in the magnitude of potential change, which is more pronounced for C_{cis}/C_{trans} = 100. However, the trends of exponential drop in potential with distance from the nanopore edge, the increase in change in potential for higher C_{cis}/C_{trans} and smaller nanopore diameters, and larger decay length of the potential drop for smaller and thinner pores are the same in both the models. The difference in the results arises likely from the different assumptions made in each model. For the analytical calculations, no surface charge of the nanopore was considered, while for the COMSOL simulation a nanopore surface charge density of -20 mC/m^2 was assumed. All calculations were performed for an ionic voltage of 1 V.