

Translocation of polymers through nanopores is ubiquitous in both biology and biotechnology. *In vivo*, cell metabolism is completely dependent on biopolymer's translocation such as RNA and polypeptides. On the other hand, in biotechnology, the process is applicable in different areas such as controlled drug delivery, gene sequencing, polymer separation, and protein sensing. In this talk, after addressing the importance of polymer physics and especially polymer translocation, we will discuss examples of both *in vivo* and *in vitro* translocation. Afterward, we will introduce some projects which are currently underway in our group at IUST. Particularly, while introducing the NAMD and ESPResSo MD packages, which we employed for biological and coarse-grained simulations, the DNA translocation through graphene both by the electric field and SMD will be discussed. Then, our works on polymer pore interactions and pore shape as well as nanoparticle effect on translocation through the pore will be presented.