Abstract:

About 50 billion cells in your body go through mitosis each day, a process that requires a mother cell replicating and splitting its DNA among two daughter cells. We know that DNA is super-coiled and is very knotted in the nucleus for space purposes. Yet, with overwhelming probability, DNA manages to split evenly even in this highly tangled state. As it turns out, there is an enzyme called Topoisomerase II which cuts and glues DNA to let other strands of DNA pass through. No one is quite sure how this enzyme works or makes decisions on when to cut. In this talk, we’ll explore a model that assumes Topo II makes strand cuts based off local topological properties. We’ll also look at some results of numerical simulations to see how well this model mimics the true behavior of Topo II.