Title: Out of equilibrium dynamics of a single polymer chain

Abstract:

The dynamics of a single simple polymer chain has been known since quite a while. However, when polymers are driven out of equilibrium novel regimes may arise.
In this contribution I will discuss two scenarios in which a simple polymer is driven out of equilibrium by different means.

In the first part I will discuss the problem of polymer translocation across a varying section channel. In particular, I will show that for smoothly varying channels and gentle external forces the dynamics of the confined polymer can be mapped into that of a point-like particle in an effective potential. This mapping provide a nice tool to investigate the dynamics of polymer is such circumstances and in particular can explain the observed non-monotonous dependence of polymer translocation current on polymer size.

In the second pat I will discuss the dynamics of a polymer made of "active" colloids, i.e. colloids that, like microswimmers, can induce a net force on the backbone of the colloid. By means of Brownian dynamics simulations I will show that the activity induces a coil-to-globule-like transition and that the effective diffusion coefficient is strongly enhanced.
In particular I will show that this effect is maximum when the effective force generated by the active colloids is along the backbone of the polymer and strongly diminishes when the force is assumed as isotropic .