

**ANNOUNCEMENT for a MASTER PROJECT in the *Westerlund Lab***

**Duration: 6-12 months**

**Start: Spring or fall 2020 or upon agreement**

**Studying secondary structures of DNA and RNA and their interactions with proteins using optical tweezers**

Understanding DNA structure and interactions is vital as DNA carries the genetic information which makes up the basis of all living organisms. Consequently, numerous techniques have been developed and used for studying structure and dynamics of nucleic acids as well as their interactions with proteins on the single DNA molecule level. Optical tweezers make it possible to manipulate nucleic acids and apply or measure forces in the range of pN with nm resolution [1].

The project focuses on investigating DNA and RNA and their interactions with proteins (especially proteins involved in DNA repair) using an in-house built optical tweezers setup. The candidate will be involved in designing, performing experiments and analyzing the large data sets with custom made MATLAB programs. We are looking for a candidate in the field of biophysics, biological engineering, biophysical chemistry or physics, preferably with experience in programming (MATLAB). The candidate will work in the group of Prof. Fredrik Westerlund (Department of Biology and Biochemical Engineering) in close collaboration with Prof. Marcus Wilhelmsson (Department of Chemistry & Chemical Engineering).

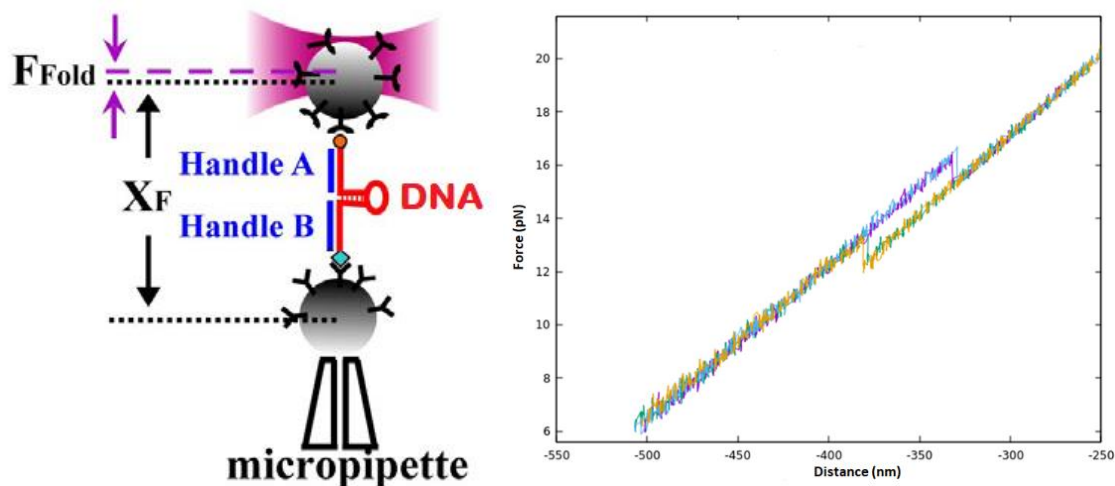


Figure 1: Schematic of DNA Hairpin held between functionalized beads trapped with a laser trap at one end and micropipette at the other end [2]. Figure showing the unzipping and re-zipping of a DNA hairpin using optical tweezers to study the thermodynamic properties of DNA.

1. Camunas-Solder J et al., Annu. Rev. Biophys. (2016) 45, 65-84.
2. Ritort F., J. Phys : Condens Matter. (2006) 18, 531-583.

**Contact:** Professor Fredrik Westerlund [fredrik.westerlund@chamers.se](mailto:fredrik.westerlund@chamers.se), division of Chemical Biology