**Bachelor-Project**

**Controlling flow at the micro- and nano-scale in zebra-patterned micro- and nano-fluidic devices**

**Abstract:** When ions are driven by an external electrostatic field, their net motion will generate a net flow in the surrounding fluid called electro-osmotic flux. In microfluidic devices, the onset of such a flux ultimately depends on the effective interaction between the fluid and the inner walls of the channel. In particular novel scenarios can occur when the channel properties are not homogeneous, as it has been recent shown for the case of a varying-section channels [1]. In this project we aim at extending this study by taking into account the local physico-chemical properties of the channel. By tuning the local properties of the channel walls we will characterize the new possible dynamics scenarios.


**Learning content:**
- Non-equilibrium Thermodynamics
- Low Reynolds Hydrodynamics
- Electrostatics in the presence of electrolytes

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