

## Atomic force spectroscopy

The course is aimed to provide a comprehensive approach to force spectroscopy measurements performed with the atomic force microscope, enabling the determination of different biophysical properties of single biomolecules, biomolecular assemblies and cells. In particular, measurements of unfolding forces of nucleic acids and proteins, ligand/receptor interactions, adhesion forces, nanoindentation and mechanical yielding forces of bilayer lipid membranes and protein crystals, elasticity of biological samples (membranes, tissues and cells) will be analyzed. The models used to extract information from the measurements, will be discussed, including the freely jointed chain and the worm like chain models for biopolymer extension, the Johnson-Kendall-Roberts model and the Bradley model for adhesion, the Hertz model for elasticity. The effect of the loading rate on unfolding forces and the methods used to obtain the key features of the energy landscape of single molecules will be discussed.

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