



## Methods in molecular biophysics

Lecturer: dr hab. inż. Maciej Bagiński, prof. PG

### Course description:

Since understanding cell organization and function on the molecular level is more and more important, methods of molecular biophysics became indispensable tools in molecular, cellular and structural biology studies. Our knowledge concerning biological macromolecules and their mutual interactions is based on the application of physical methods, ranging from classical thermodynamics, through spectroscopic methods and molecular modeling to recently developed techniques for the detection and manipulation of single molecules. Therefore, the syllabus of the lecture will cover both experimental and theoretical methods dedicated to study of molecular interactions.

Part of the lecture will be dedicated to theoretical methods of free energy calculations as well as simulations of the membranes and ligands interacting with them. Other part of the lecture will include microcalorimetry with basic two methods: differential scanning calorimetry (DSC) and isothermal titration calorimetry (ITC). Next part will cover fluorescence techniques including fluorescence microscopy and application of fluorescence in biophysical research. The final part of the lecture program will include different methods of single molecule tracking, detection and manipulation.

A different approach used in biological studies consists in tackling a biological problem with a multidisciplinary approach, in which molecular biophysics methods presented during the course play a dominant role. The PhD students may have some basic knowledge about presented techniques but anyway the course will be organized in such a way that both essential theoretical background will be given as well as some examples showing applications will be provided.

### Literature:

1. I.N. Serdyuk, N.R. Zaccai, J. Zaccai, Methods in Molecular Biophysics, Cambridge University Press, Cambridge (2007).
2. M.B. Jackson, Molecular and Cellular Biophysics, Cambridge University Press, Cambridge (2006).
3. Fundamental Concepts in Biophysics, T. Jue Ed., Humana Press (2009).

TERMINY WYKŁADÓW			
Data	Dzień tygodnia	Godzina	Sala
01.06.2012	Piątek	9-12	LUWR (Chemia A)
06.06.2012	Środa	10-13	LUWR (Chemia A)
11.06.2012	Poniedziałek	10-13	LUWR (Chemia A)
15.06.2012	Piątek	10-13	LUWR (Chemia A)
19.06.2012	Wtorek	10-13	LUWR (Chemia A)