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**Friday, 23<sup>rd</sup> November 2018, 14:00 s.t.**

TU Wien, Institut für Angewandte Physik, E134  
1040 Wien, Wiedner Hauptstraße 8-10  
Green Tower „A“, 3<sup>rd</sup> floor, SEM.R. DA grün 03 B (SEM 101B)



### From Description to Prediction of Biointerphase Reactions

I will give two examples of the evolution of concepts in Biointerphase science from a purely descriptive understanding to a quantitative model. The first example refers to the dissection of attractive and repulsive interactions between objects in an aqueous phase using Grand Canonical Monte Carlo calculations and their comparison to measurements using osmotic pressure or a surface force apparatus. I will show, that the resulting net force between two objects is due to a subtle balance of direct, electrostatic, dispersion and hydration forces and thus depends on parameters such as molecular density and conformation in the organic films or colloids.

Many experiments in Biointerphase Research aim to determine the number of cells or organisms adsorbing on a surface. In order to discriminate between physisorbed and settled cells, a rinsing step is applied when the sample is removed from solution. However, no information is obtained which shear flow is required to overcome the activation barrier of detachment to remove the cell. Recent experiments and theoretical work to understand adsorption and detachment of small objects from a surface under shear flow will be discussed with reference to the formalism used in basic gas phase adsorption/desorption experiments. The kinetic equation used in gas phase experiments can be modified to describe adsorption and detachment of particles from a surface under shear flow, where temperature is replaced by shear force to determine activation energies. This predictive model and formalism will help to advance microfluidic based diagnostics and contribute to the design of environmental benign anti-fouling surfaces.

All interested colleagues are welcome to this seminar lecture (45 min. presentation followed by discussion)

Friedrich Aumayr  
(LVA-Leiter)

Gerhard Schütz  
(Seminar Chair)