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Decoding single-molecular reactions and interactions at dynamic solid/liquid interfaces

When two surfaces come in contact, the interface is rich in forces of diverse nature: covalent and ionic bonds, Van der Waals attractions, hydrophilic interactions, electric double layer, etc. The surrounding medium, usually an aqueous solution containing a number of ions, adds to the complexity of these exchanges. It is in view of this intricate landscape that several techniques are called onboard for a full picture of bond energies, average work values, and reaction constants to be put together.

Surface functionalization, hydrophobic attraction studied on a membrane model system, average work and energy dissipation after bond breaking and pulling of polymeric tethers, and electrochemistry as an approach to other adhesive processes, especially those related to biocompatible molecules, are the focuses of research that will be incorporated into my thesis.

The integration of AFM, electrochemistry, and optical tweezers is worth much more than its parts, and will yield complementary results that enable us to assemble a large "free-energies puzzle" in the field of surface & interface science.

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

Friedrich Aumayr
(LVA-Leiter)

Markus Valtiner
(Seminar Chair)