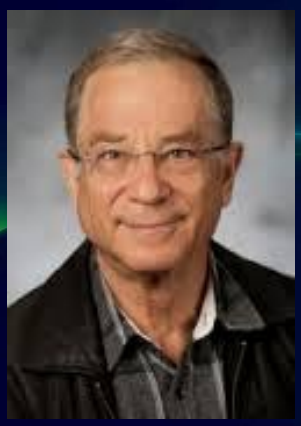
Faculté de pharmacie

Séminaire de l'axe

« Formulation et analyse des médicaments »



Dynamic (non-equilibrium, rate, time, and history) dependent intermolecular and surface interactions in biological systems

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Pavillon Claire-McNicoll
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À l'invitation du professeur Xavier Banquy

Most theories of surface and inter-particle forces or interactions are equilibrium theories. A few deal with steady-state situations, while others deal with kinetic aspects, such as the kinetics of aggregation. In the former, there is a continuous and constant supply and expenditure of energy, ensuring that the system under observation does not change with time. In the latter there is a definite starting state and an end state, where the kinetics depends on diffusion rates or simple viscous effects. Such dynamic systems, *and more complex ones*, occur throughout the colloidal and especially the bio-colloidal domains. With the increasing appreciation of the complexity of colloidal and biological systems – now also referred to 'complex fluid' and 'soft material' systems – many more types of rate, time, and history-dependent phenomena (interaction forces and processes) have appeared whose essential feature ***is*** their non-equilibrium nature. These will be reviewed, especially recent experimental studies of interactions in colloidal, soft material and especially biological systems, which can involve electric double-layer and van der Waals (DLVO) forces, repulsive hydrophilic (hydration) and attractive hydrophobic forces, Coulombic (electro-static) and polymer-mediated interactions, non-covalent bio-specific (complementary, ligand-receptor) interactions, as well as deformations (e.g., of adhering membranes or vesicles), coalescence (fusion), slow structural rearrangements, and various relaxation processes of biopolymers or electric charges (as when ions and water slowly exchange and diffuse through bilayers or membranes). Scaling effects of length (size), and time will also be discussed.

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