The Early Stage Researcher (ESR) will work on the Work Package WP3 "Wetting and electrokinetic properties of solid supported lipid layers".

The objective of the study will be investigations of wettability and topography of mixed lipid layers surface and their electrokinetic properties, especially in the presence of enzymes and antioxidants.

Also the study of effects of lipids as bio-surfactants on stability of dispersions is of our interest.

Both the monolayers spread on a liquid subphase (e.g. water), i.e. Langmuir films, as well the layers transferred onto a solid support (mica, silicon, glass, gold, polymer, and others) called as the Langmuir-Blodgett films are a subject of our study.

The wettability of solid supported films is investigated via measurement of advancing and receding contact angles. Having the contact angle values and applying suitable theoretical model it is possible to calculate the film apparent surface free energy. To get more information about properties of the layers topography of their surface is determined using optical and spectroscopic methods, like AFM, TEM, SEM, optical profilometry, Raman spectroscopy, and others.

Tracking the changes in the energy caused by enzymatic hydrolysis reaction, it is possible to produce the surface of desired hydrophobic/hydrophilic property.

The properties of lipid liposomes are also investigated, among other methods, by measuring their size and size distribution, electrokinetic potential, and adhesion to the solid supported lipid films or to mineral nanoparticles dispersed in the system.

It should be also mentioned that not only wetting properties of these systems are studied but also other solid surfaces, also those modified by plasma treatment, including the deposited lipid films. The plasma treatment usually causes an increase in the surface hydrophilicity. In the case of polymer surface such treatment may enforce adhesion of polar nano- and/or micro- particles. This can allow preparation of the superhydrophobic surfaces.

Thus, it is clearly seen that there are many issues dealing with these systems which interesting for investigations and which can be a subject of PhD study.

The position is available starting from January 1, 2014. Applications are welcomed from candidates possessing Master Degree in Chemical Engineering, Chemistry, Physical Chemistry, Biology or related fields and having a strong interest in computational work. The candidate besides Master Degree in above mentioned disciplines (Chemistry, Physics, Chemical Engineering, etc.), should be fluent in English, and preferably should have some background in Colloids and Interfaces.

Please send your application including CV, motivation letter and transcript of academic records to Prof. Emil Chibowski (emil.chibowski@umcs.pl) or Dr. Aleksandra Szczes (aszczes@umcs.pl). The policy of equal opportunities will be followed during the recruitment.

Eligibility criteria

The master title at the time of recruitment should be not older than four years.

At the time of recruitment the researcher should not have resided or carried out his or her main activity in Poland for more than 12 months during 3 years prior to the reference date of the application.